

MOTOR AGE

Vol. XXX
No. 24

CHICAGO, DECEMBER 14, 1916

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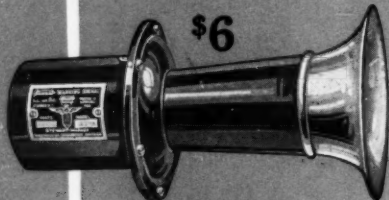
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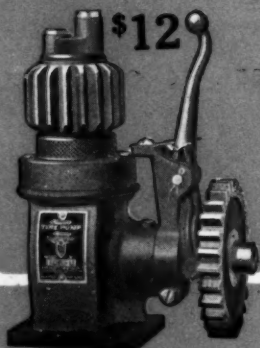
Stewart Motor Driven Warning Signal
\$6



Warner Auto-Meter
\$50



Stewart Vacuum System
\$10



Stewart Tire Pump
\$12



Stewart Hand Operated Warning Signal
\$3.50



Stewart Speedometer for Fords
\$10

MOTOR AGE

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Established 1852

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Dealers in every section of the United States are reporting actual sales of many hundreds of the new Series 18 Studebaker cars. They tell us that never in the history of the industry has an announcement of new models created such enthusiasm and buying activity. They've had crowded showrooms all week long—and small wonder!

You read our four-page insert in this magazine last week, of course, and you cannot help but realize the reception the buying public was sure to give the new Series 18 Studebakers. With no radical changes in the basic Studebaker design, but with many new and exclusive additional features, the Series 18 cars embody all the essentials that the motor car buying public expects to find in cars costing from \$2,000 to \$3,000. They give the dealer something to talk about—added refinements and improvements that offer an irresistible appeal. The Studebaker owner now receives every desirable feature the industry knows—at prices that are from 50% to 100% less than other cars of corresponding value.

Read last week's Studebaker announcement over again. Note what we say about the Series 18 Studebaker's fine gun-metal finish, deep genuine leather upholstery, individual and adjustable front seats, the new reversible seat next to driver's, comfortable arm chair auxiliary seats, Yale Ignition Lock, Blackmore Door Curtain Opener, etc. These are only a few of the many factors that give the Studebaker dealer a great advantage over the majority of competition.

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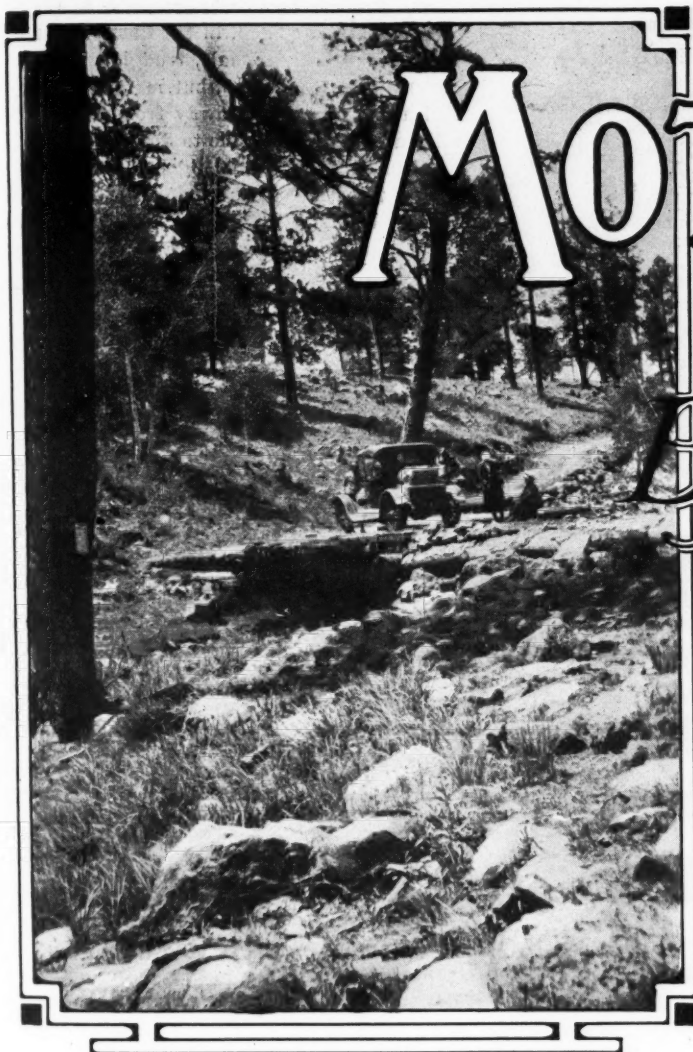
South Bend, Ind.

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Fish creek, near Springerville, Ariz.

MOTOR AGE

By Motor to the "Happy" Hunting Grounds

By Ruth Sanders

DO you ever hunt? Where there is sunshine in the open and shadows in the forest and wind among the branches and the rain-shower and the snow-storm? Where the labor of the long trail brings you famished back to lodge, with the keen edge of sharp hunger and the feeling of well-done? Where you sit around the campfire and wonder how you lived before this relaxation in following the untame tribes?

Or, perhaps you'd never thought, as you motored out the road, that the best thing in this motoring is what it lets you do. And if you did think of all these possibilities and give them any heed, you hadn't heard that hunting grounds were open to your car. But they are, and in the happy hunting grounds not far from the beaten path that links this coast to that with bonds knit closer yearly are all these possibilities with their hope of probability. Just off the great transcontinental that discovers the wonders of open, in the state of Arizona, in the region of White mountains, the happy hunting grounds of our forefather's red brother are ready as of old.

There turkeys call from roost in the trees in the depths of the tangled woods and dare the moon to shine full bright or

the dark to keep them hidden. The leader peers into the shade, suspicious of secret foe, and ruffles his suit of many tones in an anger all undue.

And deer step lightly from spot to spot with quivering nostrils to breeze, and turn in file to seek the creek with its quench of hurrying thirst. A sentinel stands with head aloof, of the caution descended from old, and awaits his turn at the running water, that no danger may come unknown.

And cool brook depths give occasional wince as the agile trout cuts its breast and looks abroad on the scenery, full sure of his royal vogue. He darts and glides from side to side, more quickly than eye can follow, and taunts the whole wide world alike with boast of self uncaught.

The quail call, too, from their home in the woods in a drift of fallen leaves and watch the geese as they fly away on the wings of chilling winds. They shrink and hide at the crack of twig or melt into blending growth, as if sure chance holds no trumps for them in the game of a life un-lived.

There surely content in following the trail is offered in the wide acres of virgin forest with pines and mountains and cold trout streams that challenge the angler's

skill. A visit to that section should bring your eternal allegiance to this the home of the turkey, the quail, the deer and the trout, with other of their kinsmen thrown in for a brimming measure.

It must have been about here that Gitche Manito, the mighty, the creator of the nation, stood when he said:

I have given you land to hunt in,
I have given you streams to fish in,
I have given you bear and bison,
I have given you roe and reindeer,
I have given you brant and beaver,
Filled the marshes full of wild-fowl,
Filled the rivers full of fishes;
Why, then, are you not contented?
Why, then, will you hunt each other?

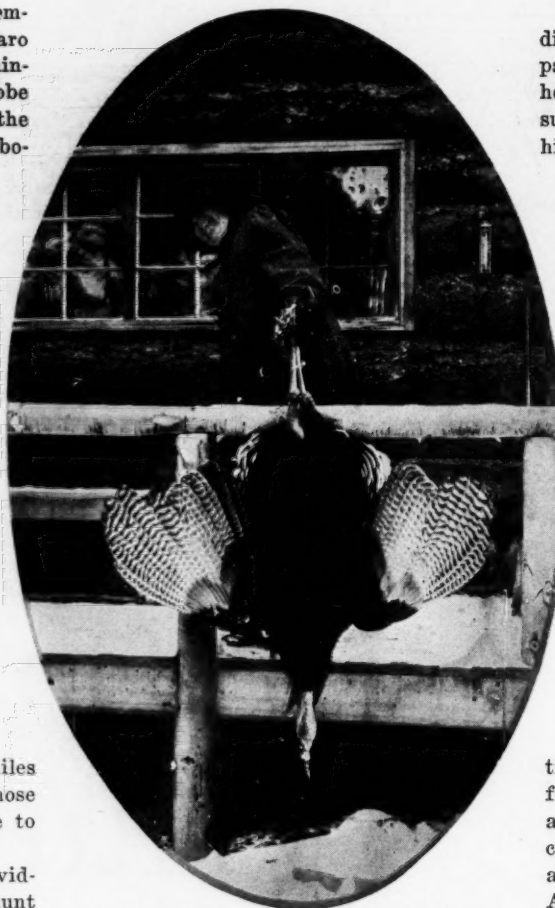
And perhaps this is why Arizona today is the most law-abiding of all the states, as shown by criminal records. The words of Gitche Manito, the giver of bird and beast and the fish, were weighty, and his gifts to the country convincing. Dove and white wing, most gentle of game birds, find peace in the luxuriant mountains. The pines make the homes of the rail, the gallinule and brant, while snipe, plover and yellow-leg still call it their country.

All this in the state of the desert, the American Egypt, where 30 years ago sand and sagebrush and cactus and snakes and lizards and coyotes were said to be the chief products of nature! Where cattle-

men and sheepmen still fought for supremacy on the wide, open ranges, and faro players pursued a thriving business in mining camps and cowtowns. Where adobe and corrugated iron made most of the white homes. Where only the native aborigine, the red man, knew fully the magnet of hunting ground, and the white man lived only to struggle and fight the stubbornness of unused plains.

Today fields of sleek cattle graze knee-deep in the fields of bright waving alfalfa, where the desert once reigned in an arid, sun-baked, forbidden kingdom. Ranch houses of cement and wood have supplanted the iron and adobe. Cottonwoods line the big irrigation ditches, which were built with the force of pure pluck. Most of the arid regions have small growths of moist green, even in dry season, while the rains bring the magic of bloom so brilliant and varied as to be incredible in sheer loveliness. And capping it all the largest pine forest in all the United States is in the state of the desert—covering 6,000 square miles. Here are the happy hunting grounds, where range after range of mountains rise 2 miles or more into the sky, as they did in those days when only the desert gave name to the state.

Two distinct regions exist; the dividing line separates the place of the hunt from the arid acres of less luxury. An imaginary line from Bisbee on the southern limits to Mohave City on the Colorado would show the difference properly. For north is the plateau 6,000 ft. high and south is the arid unfertile land broken by hills and ranges of mountains. The plateau is mountainous and wooded, with grass and plenty of water. Cold, dry winters come, and the rain sends down 30 in. annually. The arid land has sparse vegetation, starved by the 3-in. rainfall given grudgingly each year.



Mrs. James Willard Schultz kills a big gobbler

The state of the desert is fast becoming the state of the wonders, especially since the coming of motoring. For who can deny it is such rather than a state of the desert, once seeing? With a canyon that defies imprisonment in words, a land of a divine color painter, the marks of centuries of craftsmanship, the example of a civilization antedating Columbus by aeons—what more could you ask?

And you see these wonders, not as they did 30 years or so ago, in the dust-blinding path of the pack-animals, trudging to find home in the wilderness, but motoring over such roads, stretching away from the foothills, as would do justice to John Macadam himself. Because long has the sound of the white man's motor car startled the echoes in the land of the red man's bronchos, and roads are the motor car's requisite.

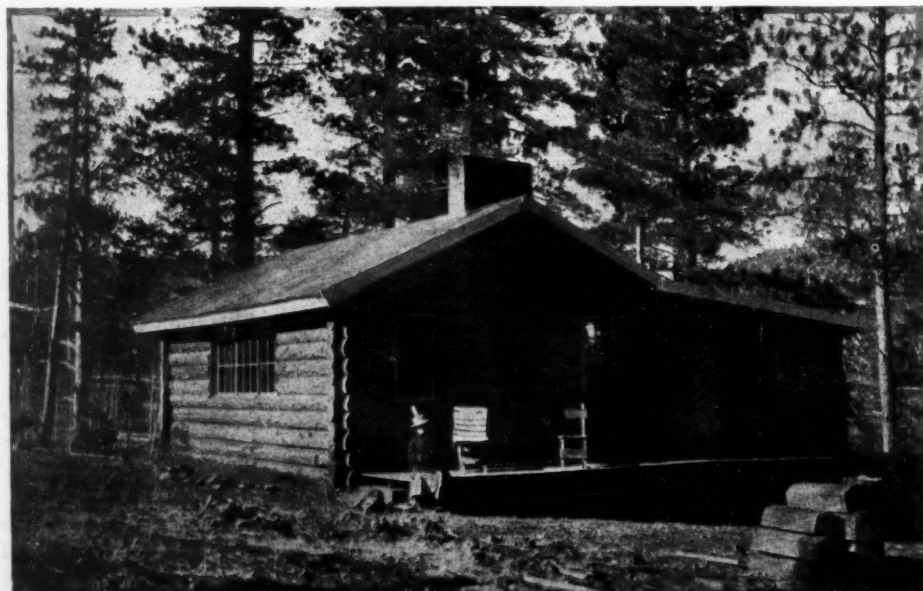
For several years Arizona has had outlined on paper the making of a north and south and east and west system of highway. Much has been done already, and the road you will follow, if you motor to the happy hunting grounds, rises on a bed made of cinders to cross the crest of the high mountains. Lack of funds alone has prevented realization of the entire system, and the loan of men from the state prison has helped to make this lack less delaying.

It has not been so long, you remember, that there has been leisure for road-building. First must the cement, the barbed-wire fence and the irrigation ditch supplant the adobe and iron and fruitless stretches, and alfalfa and maize and cotton the sand and sagebrush and cactus. Three epochs gave Arizona change, and three rules gave her people unrest. Aboriginal, exploratory and reclamationary—the civilization of the apartment dwellers gave way and was lost; then came the entrance of the pioneer to penetrate and explore and map out an unknown region and carry law, order and justice where centuries had recognized none of the three; and after this the building of ditches and dams filled the months.

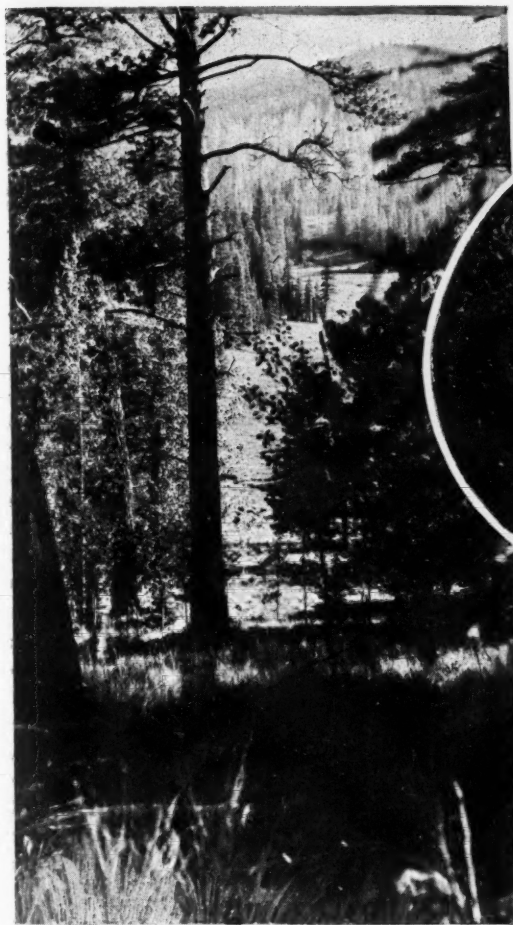
Roads Lead to Wonders

But leisure for road-building has brought leisure for motorist in the opportunities revealed by the penetration that comes with the highway. If the motorist wish he can visit with ease the points recognized as symbolic of the three epochs written in Arizona's history. He can motor to the ruins of the Casa Grande, "the Great House," 60 miles southeast of Phoenix. He can watch the Mission of San Xavier del Bac grow on the horizon as he motors toward the carved wonders of its ancient structure 6 miles from Tucson. Or he can follow the highway over the great Roosevelt dam, one of the most effective words in reclamation.

If he motor to the White mountains, he will find some evidence of all three and more, for hunting and fishing are ageless. Springerville is a favorite outfitting place for the game region. It is on the National Old Trails road and has had the experience with transcontinental motorists that makes for efficient service. It is located in a valley, and is trading point for an agricultural and stock-raising territory. Here also are the headquarters of the Apache National Forest Reserve, that forest of the



Mr. and Mrs. Schultz named their home among the pines "Butterfly Lodge"



Mister Turkey calls this his country

yellow pine, the largest of pine forests, filled with deer, turkey and bear, with trout streams—the happy hunting grounds for the camper and sportsman.

It is southwest of Springerville that the mountains are crossed by the cinder road to Cooley's ranch, the home of Cooley, chief scout when Crook waged his campaigns against the Apaches. In this region once lived Geronimo, the chief. Geronimo's people, the Apaches, still live in the same old way as they did when Geronimo led them on the warpath.

Inquiries Are in Order

It would be well for you to make inquiries in Springerville if you start for the hunting and fishing grounds, for the forest service guards well its ward, and regulations change from time to time. Becker's store will give you this information, as well as tell you of necessary detours or road conditions. Unless the game laws have been changed more recently, the open season for male deer, quail, wild turkey, dove and white wing, snipe, plover, yellow-legs, coop, chick, goose and brant is now on.

The male deer season lasts from Oct. 1 to Dec. 16. Quail may be killed between Oct. 15 and Feb. 2. Wild turkey are not safe from the hunter from Oct. 1 to Dec. 16. Dove and white wing may be shot between June 1 and Feb. 2. The open season for gallinule and rail closed Dec. 1,



Monsieur Trout displays a taste for changing waters, as above. Br'er Bear, though, thinks the scenery below more fitted to his style

having lasted from Sept. 1 for the gallinule and from Oct. 15 for the rail. Snipe, plover, yellow-legs, coop, chick, goose and brant are legal game from Oct. 15 to Feb. 1.

A bag has its limit, however. Only two deer and three turkeys are allowed during one season. Twenty-five quail, twenty-five ducks and thirty-five doves or white wings are the bag limits for these birds. You may catch 20 lb. of trout, bass, croppie or catfish during the day, or forty fish in all each day.

If you are a non-resident, it will cost you \$25 for a license to hunt deer and \$10 for one to hunt birds or fish.

Hotels Are Ample

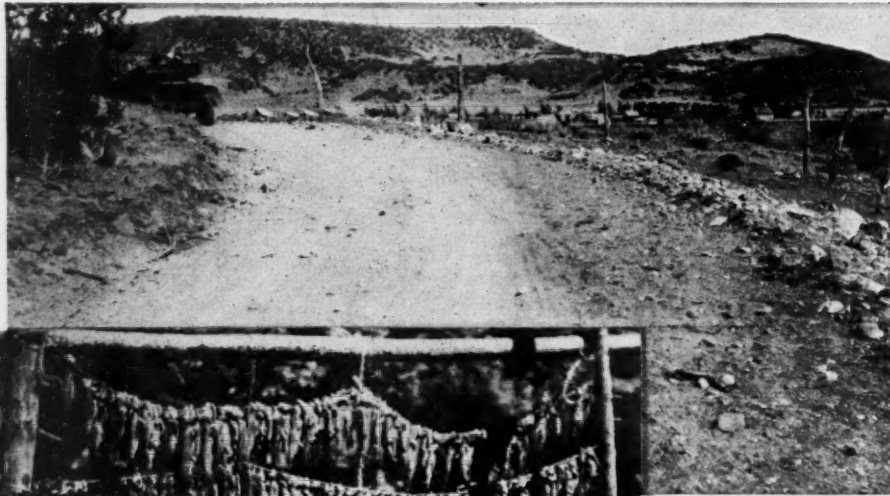
After you leave Springerville, on the road for Globe, for instance, the first available accommodations are the Indian Reservation School and perhaps Fort Apache, but as this trip is only a day's run and as you will want probably to join the army of campers if you hunt or fish, there need be no fear of not finding adequate hotel provisions. You may strike for the hunting and

fishing grounds from Flagstaff, the skylight city. South is Oak creek with its famous trout stream and the excellent accommodations at Lolomai Lodge.

Thinks This Region Best

One of the authors of books on things western has chosen to have a home in the game region of the White mountains after trips to the wild country of the Pacific coast and other sections of the Southwest. James Willard Schultz has found just what he wants in the White mountains—plenty of game and trout in a high and easily accessible forested mountain country. He has a shooting lodge near Greer, a settlement of about half a dozen pioneer families who supply him with vegetables and cream and horses when they are wanted.

Greer is right in the midst of the happy hunting grounds. It is 108 miles south of Holbrook and 18 miles south of Springerville, only 5 miles off the ocean-to-ocean highway and at the end of a good branch road. The elevation of Greer is some 8,500 ft. The summit of the range, about 10



Anyone would think it possible to go by motor to the happy hunting grounds on roads like this. And look what the goal offers! One day's catch

miles south of Greer, rises for 11,496 ft.

This is just within the northern boundary of the forest reserve, with its firs, white pine and spruce and a little underbrush mingled with the yellow pines for which it is famous. Here parks of luxuriant grasses and wild flowers make the homes of the bear, the deer and the turkey what they are, while the countless small streams are for the most part rich with finny game.

Streams Filled with Trout

The Little Colorado and the Black and White rivers come within the reserve and Mr. Schultz writes that they and the

streams that feed them are alive with native trout, ranging in weight to as high as 5 and 6 lb. The Little Colorado itself also has been stocked with rainbow trout from California, and on both the Colorado and the White rivers are good camping and fishing sites accessible by motor.

The variety of game in the reserve would outfit an unusually good menagerie. Grizzly and black bear, cougar and wolf, wild cat and coyote; it is only to begin the list. Deer, both the mule type and the Mexican variety of white tail, or Virginia deer, are plentiful, and wild turkeys range the forest everywhere. Ducks have no end in

season, and the blue grouse and quail are well represented. Mr. Schultz finds deer and turkeys close to his shooting lodge, which he has built in the midst of the game. He has killed several big gobblers near his front door.

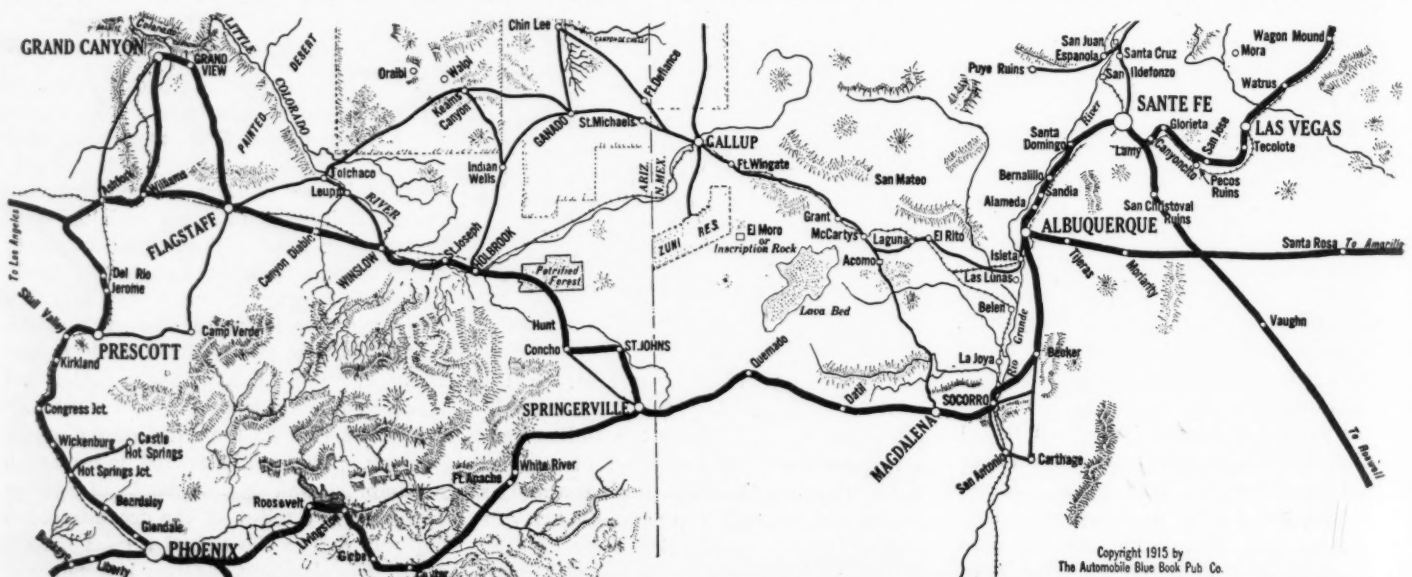
Sites for Lodges Ready

At Springerville motor hunting and fishing parties find place at the Blue Book Hotel. At Greer, John Butler, one of the best guides in the country, says the author who likes to hunt, can accommodate parties. The supervisor of the reserve is Frederic Winn, whose headquarters are at Springerville. He has recently had several sites surveyed near the Schultz lodge, and these are to be rented to those wishing to build shooting lodges or summer residences, on long-term leases at something like \$5 a year. All sites have fine springs that can be piped into the house, and the leases last 33 years, with privilege of renewal.

So, if you wish to know the trout, that game and wary king of fish, in his home among the pines, where his temperamental soul calls for flies that fit the month, what should keep you waiting? Not the road, and not the living provisions. Near the streams that cage his jumping, sway and toss the tall pine trees, and in the evening many a sportsman watches his campfire light the darkness.

And it is said that nowhere else save in Arizona is quail-hunting such a sport, for the top-knotted mountain variety has a method all its own. It is agile; it is loud-voiced; and there are tales that tell of wild dashes down the rocky slopes and painful climbs to top. This, of course, might sound too bad, but, cheer up, the quail are bagged, and no true hunter cares how hard he works if the sport turns well at last.

You may not care for the odors of the forest and the curling smoke of lodges and the rush of silent water and the delicacy of wild flowers. Learn to care. That's



A loop made of connecting trunk lines incloses the hunting grounds of the state of Arizona in a region easily accessible by motor. There wild turkey and quail and trout dwell in their various corners



Becker's lake and the garage shown here help tell you of the information ready at Becker's store

what motoring is meant to do, widen interest and bring new pleasures, health and quickened living.

Br'er donkey is there, too, very much in evidence, and for those mountain trails that are too perpendicular for even the best of cars he is much in demand for hunting. He, too, is temperamental, as temperamental as the wily trout. Only his temperament is in his legs and not in a sense for color. Great yarns are told of the donkey that gets discouraged when the trail of the deer is long and the hunter is heavy. His discouragement always goes to his legs, too, which makes it bad for the hunter. Such a weakness as comes over him, and the only remedy for the malady is to lift him up and encourage him to go on thus. Fortunately, the donkey you may use in a long trek after deer is small, and the lifting can be done.

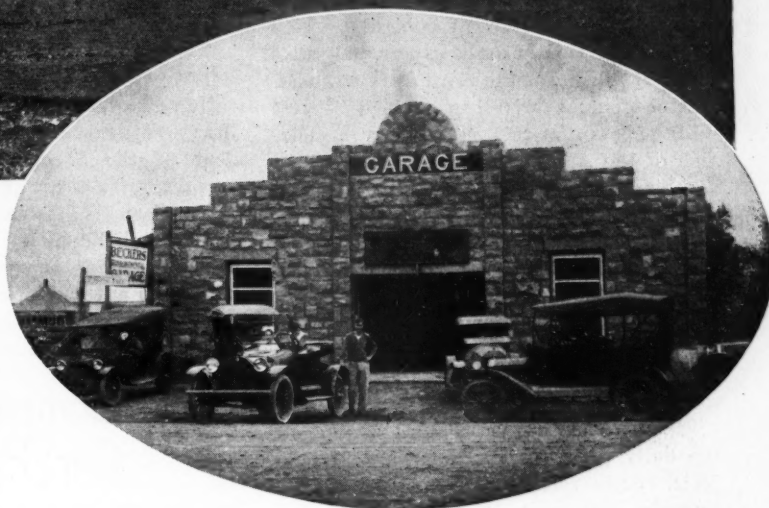
Phoenix Has Game Access

The game region nearest Phoenix lies in the Mogollon mountains, about 100 miles away. It consists of an immense, pine-covered plateau, 30 or 50 miles long, and

offers both game and fish. In the valley around Phoenix are flocks of quail, white wings, doves and ducks. The larger game and fish are in the mountains mentioned. There

you will find deer, bear, wild turkeys, mountain lions, lobos, coyotes, lynx, wild cats, grouse and pigeons—variety without equal. Trout fishing is at Oak creek, mentioned before as accessible from Flagstaff, White river and other of the boundless streams of this arid state. The mountains of the region are heavily timbered and are cut by canyons ranging from those only a few feet deep to the grand canyon, the wonder of the world, more than a mile deep and 13 miles wide.

As to climate: Few places can afford to compete with Arizona in the variety of climate. By motoring but a short distance, and thus going into higher or lower altitudes, a few hours exchanges the orange groves and palms of the semi-tropics for



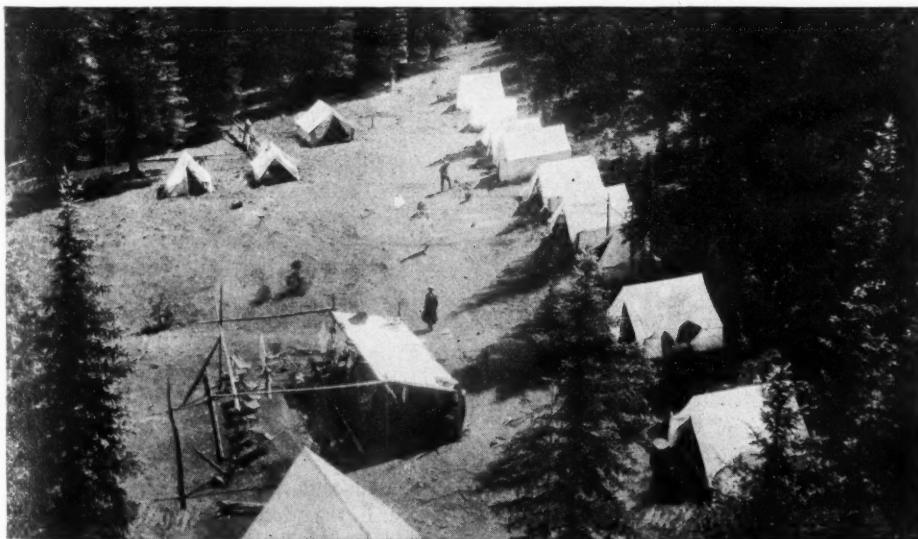
the pine-clad mountains such as give the hunting grounds. The temperature desired can be found within a short journey, by leaving the valley for the mountains or by leaving the mountains for the valley.

If you would alternate informality of hunting and fishing with the medicinal spring resort, 40 miles north of Phoenix are the Castle hot springs, known for their curative waters. Here are waters mildly mineral, alkaline-saline-chalybeate, of remarkable purity and comparable with the celebrated Prussian springs. Excellent hotel accommodations await the end of a motor road, and variety of amusement is available.

Climate of Section Good

During 8 or 9 months the Salt River valley offers a mild and healthful semi-tropical climate as a haven for motorists. Fall, winter and spring are ideal. During the summer months it is rather hot for the motorist unused to similar sections of the country. During the summer season some of the valley residents go to the cool, pine-clad mountain resorts at Prescott, Iron Springs, Flagstaff, Williams, Oak Creek, White River and Pine Air—a partial list only. Arizona claims the finest winter climate on the continent, and the contentions of many tourists who have motored there substantiate her claims.

Other of the possibilities in the state of the wonders, née the state of the desert, are known to you through experience or other's praise. But if you do not know the game possibilities of the state let this bring some small share of their extent to you, so that you, too, may seek the acquisition of their acquaintance.



A tent city in the White mountains shows the glory of the hunter and fisher is undimmed by lack of game

P. O. Scanning Publicity

Postmaster-General's Office Tells Several Daily Papers They Violate Existing Law

Looked Upon as Advertising Information Rather than News

WASHINGTON, D. C., Dec. 12—Special telegram—Motor car publicity, which has been carried in daily papers, has come under the finger of the third assistant postmaster general, who has notified several daily papers that this publicity is in violation of the Act of August 24, 1912, which forbids the running of statements which are properly advertising matter and not news. Large daily papers in many cities have received letters from the third assistant postmaster general drawing attention specifically to items published which are properly advertising information. The department expects to report later on the result of its investigations.

The articles in question appearing in the daily papers cover a variety of subjects. Some refer to the opening of new agencies, others to the photographs of new cars, others to comments on winning contests, and others on various subjects. The presumption is that many daily papers have been accepting reading notices from concerns placing advertising, it being stated that the reading notice is a verbal part of the advertising agreement.

FORD WINS WINDSHIELD CASE

Detroit, Dec. 11—The Ford Motor Co. has won a decision against the Stahlbrodt Co., Rochester, N. Y., holders of a patent purporting to cover a certain type of windshield commonly known as the "zig-zag windshield," in the United States circuit court of appeals for the second district of New York.

The decision reverses a prior ruling of a lower court. The gist of the latest decision was that the windshield was a natural step in the evolution of the modern motor car and therefore no patents could be held binding.

INDORSE HEADLIGHT REGULATION

New York, Dec. 8—Limitation of the rays of headlights so that they will not rise more than 42 in. above the road at a distance of 75 ft. or more has been indorsed by representatives of the National Automobile Chamber of Commerce, the American Automobile Association, the Auto Club of America, the Motor Dealers' Association and the Society of Automobile Engineers. This limitation was agreed on as a solution of the present difficulty of determining the proper adjustment.

The representatives also discussed the need of the spread of knowledge of focusing and setting headlights. The instruc-

tion books of manufacturers were said seldom to give directions in this regard. The chief work of the organizations in the motor world then was agreed to be education of car users, dealers, repairmen and makers in the art of headlight adjustment. Those present at the meeting were: A. L. Reeves, N. A. C. C.; A. G. Batchelder, A. A. A.; Elmer Thompson, A. C. A.; C. A. Stewart, Motor Dealers' Association; and Alden McMurtrie, who has made experiments with motor car lighting.

HARKNESS LEAVES SHEEPSHEAD

New York, Dec. 12—Special telegram—Harry S. Harkness has resigned as president of the Sheepshead Bay Speedway Corp., to take effect at once. No reason is given for his resignation. The speedway made little money this year and Harkness and other heavy stockholders were obliged to put up much money to cover the heavy expenses.

Four Companies Boost Car Prices

NEWTON, Mass., Dec. 9—Effective December 4, Stanley Motor Carriage Co., advanced its prices. The five-passenger touring car which sold at \$1,975 now listing at \$2,200, the seven-passenger was advanced from \$2,075 to \$2,300, the three-passenger roadster from \$1,950 to \$2,200 and the twelve-passenger mountain touring wagon from \$2,300 to \$2,600.

AUSTIN INCREASES PRICE

Grand Rapids, Mich., Dec. 11—The Austin Automobile Co. has increased the prices on its different 1917 models as follows: The two and four-passenger roadster from \$3,150 to \$3,750; the five and six-passenger touring car from \$3,400 to \$3,750, and the seven-passenger touring car from \$3,400 to \$3,750; the coupe from \$3,950 to \$4,550; the sedan from \$4,350 to \$4,950, and the limousine from \$4,650 to \$5,250.

CADILLAC PRICES UP \$160

Detroit, Dec. 11—The Cadillac Motor Car Co. will raise prices on all models \$160, effective midnight Dec. 14. All cars shipped after that time will be charged at the new prices with the following exceptions subject to prior sale. It will furnish at present prices cars of each body style on customers' signed and unfilled contracts in the possession of the dealers on Dec. 14.

MACK TRUCK PRICES UP

New York, Dec. 9—The International Motor Co. will advance its list prices on the Mack truck Jan. 1, as follows: 1-ton, \$2,000 to \$2,150; 1½-ton, \$2,350 to \$2,500; 2-ton, \$2,700 to \$2,800; 3½-ton, \$3,400 to \$3,650; 5½-ton, \$4,000 to \$4,250; and 7½-ton, \$4,500 to \$4,600.

Racine Rubber Co. Sold

Ajax Gets Control of Badger State Concern Making Motor Car Tires

Status of Concern Bought Will Not Be Materially Changed

NEW YORK, Dec. 12—Special telegram—The Ajax Rubber Co., Inc., this city, and with factory in Trenton, N. J., has arranged for the purchase of the Racine Rubber Co., Racine, Wis., and has called a meeting of its stockholders for Tuesday, December 26, at which the purchase of the Racine company will be ratified. It is understood that this purchase will not change the present status of the Racine and Horse Shoe brand tires. The purchase of the Racine company is in exchange for shares of the capital stock of the Ajax organization.

As a part of this purchase the Ajax company has increased its capital stock from \$5,000,000 to \$10,000,000. During the last year the Ajax company has developed very rapidly, increasing its daily output from 2,000 casings to 5,000. There has been a similar increase in the manufacture of tubes during the year, a new factory building 550 by 350 ft. and three stories in height having been occupied. In addition other warehouses have been built during the year. The number of dealers handling Ajax tires has been increased from 4,000 to 6,000. In addition seven new branch houses have been opened bringing the total to twenty-three.

The Racine Rubber Co. has sold its output approximately to fifty to sixty jobbing accounts in contrast with the Ajax distributing through 6,000 dealers.

TRAFFIC MEETING IN DETROIT

Detroit, Dec. 11—Between 600 and 700 business men held a meeting last week to co-operate with the police department in the formation of parking ordinances and other traffic problems as presented to them by Police Commissioner James Couzens.

Edwin Denby, president of the Board of Commerce, presided and introduced the police commissioner. Mr. Couzens stated that the number cars in Wayne county had increased from 31,000 in 1915 to 46,450 in 1916, and there was urgent need for some drastic solution of the growing traffic congestion. He favored the extension of a no-parking area, establishment of one-way streets, absolute enforcement of the existing laws and the appointment of a committee to consider and act on the matter.

The business men made suggestions which included the following: A skip-parking plan, allowing limited parking on opposite sides of the streets in alternate blocks, a 30-min. parking limit with \$5 or \$10 police fee

downtown streets to permit parking, a municipal garage, prohibition of parking on narrow streets, 20-min. parking on downtown streets, parking between 11 a. m. and 2 p. m., appointment of a committee by the mayor, prohibition of special privileges to officials and locking of machines violating a certain parking limit with a charge of \$5, \$10 or more for the key.

STEWART-WARNER SUED

Chicago, Dec. 11—Suit for \$550,000 has been instituted by Clinton L. Walkers, San Francisco, charging the Stewart-Warner Speedometer Corp., of this city with using in its air starter which was discontinued some time ago a feature claimed to be embodied in patent No. 1,186,827 held by the complainant.

DEALERS WANT CARBOYS ON PUMPS

Detroit, Dec. 11—At a recent meeting of the Detroit Automobile Dealers' Association it was determined to undertake to have the legislature pass a law requiring all dealers in gasoline to have attached to the pump a glass carboy, of 5-gal. capacity, which must be filled in the presence of the motorist and then emptied into the tank of the car. The purpose is to stop the short measure.

Gotham Landmark Sold Madison Square Garden, Locale of First Motor Show, Under Hammer

NEW YORK, Dec. 11—Special telegram Madison Square Garden, the cradle of the motor car industry, the scene of exhibitions and spectacles of all kinds for the last 26 years, has been put on the block. Last week it was sold for \$2,000,000 to the New York Life Insurance Co. Lovers of the staid old structure, the design of Stanford White, who was slain by Harry Thaw, have visions of a modern building in its place, but the insurance company has since expressed its intention of selling it so there is a slight chance that the building will continue for exhibition purpose.

In Madison Square Garden was held the first motor car show in this country in 1900, and for 13 consecutive years the place was the setting for the national show. When the industry enlarged and more room was needed to harbor the show a successor to the historic old building was found in the Grand Central Palace. There has been talk from time to time of tearing down the garden and erecting a modern structure in its place. This will doubtless be done ere long at which time the pioneers in the motor car and accessory business will mourn the old landmark which stands as an architectural monument of New York of 26 years ago. Then it stood a towering edifice over all its neighbors, today skyscrapers tower above it on all sides.

Plans Feature Race Ascot Will Attempt to Stage Resta-Pullen-Cooper Match on Christmas

Several Other Special Events Are Scheduled for That Day

LOS ANGELES, Cal., Dec. 9—The management of Ascot Speedway is preparing a novel card for the Christmas Day events. An effort is being made to get Resta, Cooper and Pullen into a match race for 50 miles as the headliner attraction. Resta is remaining here after his national championship victory, and, although repeated efforts to induce him to drive in the Thanksgiving Day race failed, the Ascot promoters claim they have a chance to land him for Christmas. Resta never has driven the Ascot speedway, and if he refuses again, the general verdict will be that he is afraid of the improved track, on which there has not been an accident during the progress of a race.

Another of the proposed events is a 10-mile race for Fords with a new car of this make as the prize. The third feature planned is an Australian pursuit race between six cars to be entered by motion picture studios. There is a keen rivalry between the motor enthusiasts of the studios and a large number of exceptionally fast cars are owned by men who work before the cameras or direct the performance of others.

COOPER SECOND AT ASCOT

Los Angeles, Cal., Dec. 9—The mixup in the scoring, whereby it was claimed Pullen drove 151 miles in the Thanksgiving day Ascot park race that was only 150 miles in length has been settled amicably. Had the contention been proven, Pullen would have finished in second place instead of Earl Cooper. The time limit for filing a protest had expired before the matter was called to Pullen's attention, and, furthermore, the official timer awarded second place to Cooper.

WEED HAL ADVERTISING MANAGER

Detroit, Dec. 11—Julian C. Weed has been appointed advertising manager of the Hal Motor Car Co. of Cleveland. Mr. Weed was formerly with the Timken-Detroit Axle Co. F. B. Willis, who recently resigned as sales manager for the Chalmers Motor Corp., has become the vice-president of the Hal Motor Car Co.

CONTINENTAL MOTORS TO EXPAND

Detroit, Dec. 11—The Continental Motors Co. is planning to issue \$15,000,000 common and \$3,500,000 preferred stock to provide sufficient working capital and to pay off the \$1,000,000 funded debt. Outstanding stock is to be retired or exchanged for new preferred stock. At present \$472,300 in preferred is outstanding.

The board of directors has placed its

stock with the Security Trust Co., which will act as depository, and other stockholders have been asked to do so also. The new issue will be handled by William P. Bonright & Co. and Lee, Higginson & Co. Each common stockholder will receive three shares for each share now held and \$5 cash. The common stock taken by the bankers will be held for investment and not offered to the public.

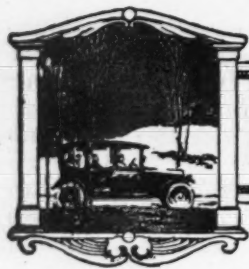
GOVERNMENT ADVISES MAIL TRUCKS

Detroit, Dec. 11—Postmaster General Burleson has advised government owned motor trucks for all manner of city mail handling as a result of successful operation of motor trucks in the six cities, Detroit, Chicago, Indianapolis, Philadelphia, St. Louis and Washington, D. C.

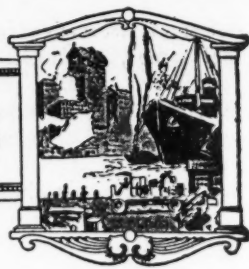
The postmaster general states that the cars that have been operated not only resulted in a reduced cost as compared with handling mail by street cars and hired motor vehicles but have also proven more efficient. In Detroit, beginning September 1, 1915, the postoffice installed 24 ½-ton, four ¾-ton, seven 1½-ton and one 3-ton truck. The 3-ton truck was later transferred to Philadelphia and was replaced by six smaller trucks.

Temporary Injunction Dodge Bros. Win First Point in Case Against Henry Ford's Expansion Plans

DETROIT, Dec. 9—A temporary injunction, restraining Henry Ford and the Ford Motor Co. from the erection of a \$12,000,000 blast furnace plant was granted in behalf of John F. and Horace E. Dodge by the Wayne county circuit court in the decision rendered today in the suit of Dodge Bros. vs. Henry Ford. The extensions to the Ford plant now in process are not affected by the decision. The judges recommended that the suit come to a hearing on its merits within 60 days. Other important findings were that the capital stock of a company cannot be considered as meaning its capital or capital assets, and the latter are not limited by the authorized capital stock. This disposes of the Dodge contention that the Ford company was outside of its legal rights because it had a capital stock of \$2,000,000 and assets above \$50,000,000. The judges also declared that while the Ford company could not engage in the smelting business commercially, under its own articles, it may engage in the smelter of ore for its own purpose. It is not shown, according to the decision, that Henry Ford dominates the board of directors wrongfully or to the harm of the stockholders. Alfred Lucking, attorney for the Ford company, has announced that he will take steps to have the injunction vacated at once.



EDITORIAL PERSPECTIVES



Education vs. Punishment

VERY few cities seem to have seen the wisdom of educating operators of vehicles to understand traffic laws and to appreciate why such laws are needed. Most cities seem to believe that the only effectual way in which to interpret the traffic laws to the ever-increasing number of motor vehicle operators is to fine or imprison them. This does not serve any useful purpose nor make the person fined or imprisoned feel kindly toward traffic officers or traffic ordinances. Physicians have advanced the theory of preventive medicine as being better than the old style curatives. Nowadays we pay our family physician to keep us well rather than to cure us of illness. This practice can be easily applied to the court solving the traffic problem and the right judge administering the laws governing traffic violations can do more toward gaining the friendliness and co-operation of motorists in general by taking time to advise the offender brought before him of his debt to the public at large than by assessing a fine or imposing a sentence.

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THAT traffic experts, chiefs of police and others throughout the country are beginning to realize the advantage of education rather than punishment for traffic law violators was evidenced last week at the annual convention of the Safety First Federation of America, details of the proceedings of this convention being given elsewhere in this issue. Chicago has adopted the educational plan in its speeders' court and has found in the handling of more than 20,000 cases that this plan is applicable to any large city, if the presiding judge is inclined to instruct rather than punish. The one-time practice of requiring traffic law violators to go immediately to the police station is obsolete in Chicago. Now they are given a written notice to appear at a certain hour and more than 90 per cent of them come to court without the necessity of issuing a warrant. The Chicago speeders' court has become well known for its fairness and the motorist who is summoned to appear before

it knows in advance that he will be given fair treatment. Statistics show that motorists brought before the court and given advice rather than being assessed a fine are seldom found before that court again, while those who have been fined are frequently among the repeaters. A motorist who is fined apparently leaves the court with the idea in mind that his obligation to the community was canceled when he handed over a certain sum to the clerk of the court. He goes out with the feeling of bitterness toward the court and co-operation from him can hardly be expected.

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ALONG with any effort to educate vehicle operators, some method should be evolved for teaching the pedestrian that street intersections are the proper places to cross any thoroughfare. Pedestrians might well adhere to the old phrase, "The longest way round is the safest way home." Vehicles do not encroach upon the domain of the pedestrian, and it is most frequently the case that the pedestrian is within the domain of the vehicle when he is run down and injured. No doubt it will take much time and an assiduous educational campaign to bring the pedestrian to understand that the fault is largely his if he is injured while jay-walking. Rules for handling vehicular traffic are easier to make and more easy to enforce, and yet with all the ease with which this problem seems to approach solution it seems far from being solved, although some of the best minds of the country are at work on it and have been for many months.

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SURELY an educational campaign touching only one phase of the traffic problem can never solve it completely, although much good can come through education on one side. Ultimately both the vehicle operator and the pedestrian will come to understand the true value of human life, and when that time comes we may expect to see street accidents largely eliminated.

Problems of Carburetion

THERE probably is no portion of the motor car whose proper functioning is more dependent upon conditions that are not within the control of its manufacturer than the carbureter. This instrument, whose function it is to transform a liquid into a vapor, mix it with air and deliver it to the intake manifold of an engine, in proper proportions for combustion, such that it will give the greatest explosive force under any conditions of speed load and temperature, is called upon for performances little short of miracles.

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EACH year these conditions become more varied and the requirements as between individual engines and different types of engines become more widely divergent. The carbureter industry therefore cannot be said to have settled upon any definite design or construction, because new ideas must be brought into play and incorporated in the design of the carbureter to meet the varying conditions of fuel and engine construction from year to year. A good carbureter is called upon to deliver a mixture of fuel and air so varied in proportions that maximum power at high speed, good pulling power at low speeds, maximum acceleration, and a low fuel consumption are provided by the same instrument without the necessity of any changing

of the setting of the instrument other than that which is made from the driver's seat.

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THE major problems this year have been the proper handling of present day fuels and proper carburetion for high-speed engines. The fuels today not only are of lower gravity than gasolines of other years, but they are less uniform, that is, the ranges of boiling points are not constant. Some gasolines are blends of fuels of different boiling points, thus making the range of boiling points wider than it was a few years ago. In the gasoline that usually was obtained several years ago, the initial boiling point was approximately 133 degrees; at 170 most of the fuel had been vaporized, while at 250 there was very little residue left.

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NOW, quite frequently the fuel must be heated to 200 degrees before a sufficient quantity begins to come off; at 380 there is approximately one-third left, and some residue at temperatures as high as 400 degrees. This means that more heat is necessary in the intake air and around the manifold. Car manufacturers can do much to improve carburetion by better manifold design. Greater attention has been given this phase of construction and many improvements are yet possible.

Motors Have Right of Way Says Illinois Court

WOODSTOCK, Ill., Dec. 9—A horse-drawn vehicle must turn to the right of the beaten path or roadway and permit a motor car coming from behind, to pass. Failure to do this makes the driver of the former vehicle guilty of negligence, in the opinion of a jury composed largely of farmers at Woodstock. This verdict was reached after a trial lasting 3 days. Mrs. Florence Reid, Chemung, filed suit against Lant Stevens, Harvard, demanding \$5,000 damages for personal injuries received in a runaway, caused as she averred, when Stevens drove his car into her buggy when she ignored his repeated signals to turn out and give part of the road. The accident occurred on the highway between Sharon and Harvard.

Would Not Turn Out

Stevens gave the plaintiff four warning calls, according to the testimony of witnesses, but she failed to respond, despite the fact that the roadway to the right was fairly level, permitting her to turn out, while to the left, the roadway dropped abruptly, making it impossible for the car to get by without capsizing. As Stevens drove past the buggy, the car collided with the wheels of the former vehicle, the crash frightening the horse, which ran away, throwing out the occupants of the buggy.

Mrs. Reid received injuries which she claims are permanent. After a hard-fought trial the jury decided in favor of the defendant claiming that the plaintiff was negligent in not surrendering one-half of the road as the statutes of Illinois require. The decision establishes an important precedent and one that will be of interest to every driver, whether of a motor car or horse-drawn vehicle.

WHEN IS CAR OWNER LIABLE?

Lansing, Mich., Dec. 9—A decision of interest to all car owners was rendered recently by the Michigan supreme court, when it decided that a hired chauffeur of a car, who uses the car for his own business or outside of the business hours during which he drives for his employer, that the owner cannot be held responsible for damage caused by his car during those hours or during the time when the chauffeur is not driving for the car owner or as per his instructions.

The decision concerns Frank E. Brinkman, a store owner, and Leo Zuckerman, a car owner. The latter has a hired chauffeur. One day he directed the chauffeur to take him to a business meeting at 8 p. m. Then he dismissed him from service until midnight. Thus, during 4 hours the chauffeur had the car at his disposal. He decided to visit some relatives and on the way took some friends for a ride. For

some reason he lost control of the car en-route and before midnight crashed into Brinkman's store and caused much damage to the building. Brinkman brought suit against Zuckerman to recover damages and the lower court held that inasmuch as the chauffeur was not acting or driving for his employer at the time the accident occurred, that the owner was thus not liable. An appeal was taken against this view by Brinkman and now the high court has upheld the lower court.

CUTTING H. C. OF SHOEING

Charles Young of York Harbor, Me., has solved the high cost of shoe repairing satisfactorily for his customers, and at the same time he is doing a thriving business as a result. Leather prices had soared over the moon and so he looked for a substitute.

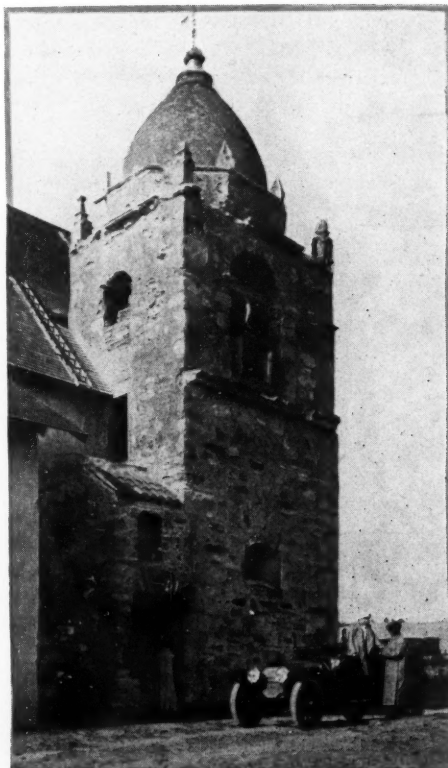
He found it in the old casings of motor car tires. Some time ago he began experimenting with worn out ones discarded by motorists, and he has bought them for from 6 to 9 cents a pound. He selects a discarded casing, flattens out its curved portion, cuts a sole-shaped piece and proceeds to repair the shoe as he formerly did with leather. As a casing wears like iron, the shoes soled with this substance are giving every satisfaction according to those wearing them.

Car Wrecks Locomotive; Engineer's Widow Sues

BLOOMINGTON, Ill., Dec. 9—She was the widow of a locomotive engineer who was killed when his engine collided with a motor car, and she sued the owner of the motor car for getting in the way of the engine, thus causing the wreck and the death of her husband.

Mrs. Mattie Everhart wants \$10,000 damages from the estate of Harper Daniels, who drove his car over the crossing of the Chicago and Illinois railway at Bismarck as the limited approached and who was himself killed in the wreck that followed. The railroad, too, has sued the estate for damages, alleging carelessness in crossing the tracks without looking to see if a train was approaching. The suit of the widow came up first, and owing to the fact that this was the first instance where such a contention was brought to the attention of the court and the likelihood of its establishing a precedent, the case was hard fought on both sides. The jury was out 26 hours, at the end of which time it was discharged. It was brought out at the trial that the level character of the ground made an approaching train visible a mile away in either direction. The case is to come up again in March.

See America First — • • • See America Now



NO. 100—MISSION SAN CARLOS DE BORROMEO

MISSION San Carlos de Borromeo, situated near the town of Carmel-by-the-Sea, and half a dozen miles from the historic town of Monterey, Cal., on the world-famed highway system, connecting the cities of San Francisco and Los Angeles, is 125 miles south of San Francisco. It is in the heart of a district rich in early California and Spanish-American romance, and hundreds of monuments to this historic era are to be seen in this locality. It was founded by Fr. Junipero Serra, Sunday, June 3, 1770. This Mission is generally referred to as Mission Carmel, because of its location on the banks of a little stream, Rio Carmelo. San Carlos Mission was Fr. Serra's own charge.

EDITOR'S NOTE—This is the one-hundredth of a series of illustrations and thumbnail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country.

Goodyear Has Big Year

Sales for 12 Months, Ended Oct. 31, Total \$63,950,399— Profits \$7,033,330

Books Show \$27,000,000 in Excess of Previous Period

AKRON, Ohio, Dec. 9—The Goodyear Tire & Rubber Co. did its biggest year's business in the 12-month period ended Oct. 31, with sales of \$63,950,399 and net profits of \$7,033,330, President F. A. Seiberling reported to stockholders at their annual meeting. A hundred-million-dollar year for 1917 was predicted.

The year's sales exceed the previous year's record by \$27,000,000, and the net profits are \$1,818,802 greater. Sales for 1916 were thirty times as large as sales of \$2,189,749 in 1908.

In the balance sheet for 1916 the company shows total assets of \$49,017,794, as contrasted with outstanding capital of \$55,000,000 and authorized capital of \$35,000,000. In the list of assets plant and equipment are valued at \$12,689,055, quick assets at \$30,682,263, and other assets, including securities, advances to subsidiary companies and the like, at \$5,846,474. Patents, trade-marks and designs are valued at \$1.

PARRY OPENS EXPORT OFFICE

Indianapolis, Ind., Dec. 9—On account of a large increase in foreign business the Parry Mfg. Co., maker of motor car bodies, has opened an export office in New York. Charles F. Schmitt, who was connected with the export office of the Ford Motor Co. 7 years, has been appointed export representative.

MILLINGTON CONVERTS REAR-DRIVE

Chicago, Dec. 9—Conversion of any standard rear-wheel-driven truck to drive on all four wheels is the effort made by the Millington Auto Engineering Co. in marketing a unique converter. The feature

of the device is that it does not disturb the rest of the driving parts or the engine, but merely replaces the front axle and attaches to driveshaft, back of the gearbox.

The first model of this converter has been built and tested out on a G. M. C. 2-ton chassis. Ninety per cent of the parts of the truck, it is said, are left intact. Negotiations are now under way for a Detroit concern to undertake the manufacture of the product on a royalty basis. Millington also contemplates the production of a \$750 front-driven 1,000-pound delivery chassis to be called the Frontaway.

Fits Periscope to Delage

Barney To Campaign Speedway Submersible Next Year

HANS ROSE, Koenig and the commanders of other German submarines will have nothing on Barney Oldfield when the 1917 racing season opens.

Barney will add one more horror to the horrors of war and introduce an innovation on the gasoline circuit by having his car equipped with a periscope.

The use of the periscope is made necessary by the revolutionary body changes that Oldfield is having made in his Delage at the Los Angeles' shops of the Miller Carburetor Co.

The graybeard of the race game is not going to take any more chances with death or serious injury and when he makes his appearance on the speedways next season will be protected by a large steel cowl, extending from the back of the car and hiding the driver and mechanic from view.

The cowl will protect Barney and his helper should the car overturn or roll after leaving the track. By means of the periscope, Oldfield will keep his eye on the machines that are pursuing him or drivers that are attempting to pass.

Noted Hotel Fire-Swept

Mammoth Cave Hostelry That Sheltered Kings and Notables Is in Ashes

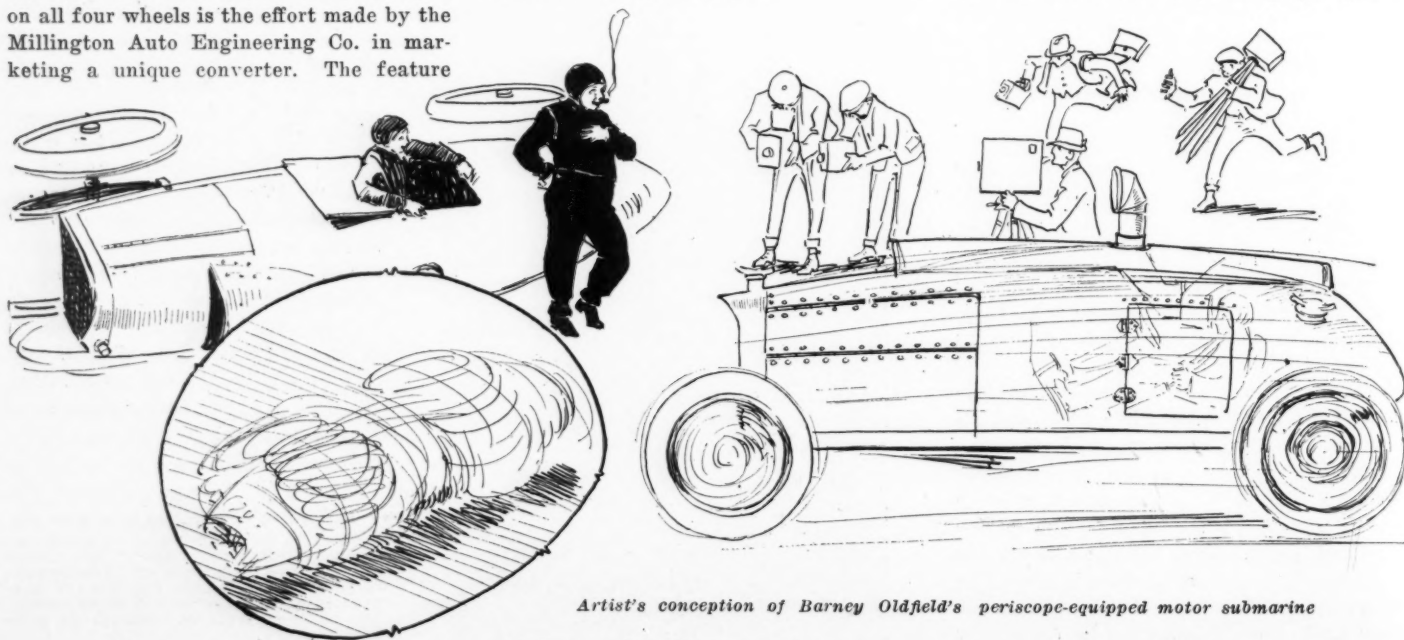
Century-old Structure Was Tourist Mecca On Way to Southland

LOUISVILLE, Ky., Dec. 9—The Mammoth Cave Hotel, visited by motor tourists from all parts of the world and perhaps the most historic structure of its kind in the United States, was destroyed by fire of unknown origin at 3 o'clock this morning. All the registers of the hotel and cave, which contained perhaps the greatest collection in existence of autograph signatures of famous men and women, were destroyed. The registers, which in part were more than a century old, bore the names of such famous personages as the late King Edward of England, Jenny Lind, Edwin Booth, the Grand Duke Alexis of Russia, and Don Pedro of Brazil.

The first building of the structure was built in 1811 and was used in 1812 to shelter the miners who secured saltpeter from Mammoth Cave to make gunpowder for the War of 1812. Around this original building the additions were ranged until the hotel assumed its present proportions. It is said that none of the hotel was built later than 80 years ago.

The cave, of course, was not damaged. While the ruins of the hotel were still smoking, visitors who had arrived in motor cars and on train were sent on a tour of the cave at the scheduled hour this morning. Announcement is made that three trips a day into the cavern will be made regularly and tourists will be cared for at the bungalows and cottages. The loss is about \$50,000. No one was injured.

The hotel had remained unchanged partly because of the way the property had



Artist's conception of Barney Oldfield's periscope-equipped motor submarine

been left in trust to the heirs of the original owners. There was no provision for the expenditure of funds on improvements. In the last few years there have been efforts to have the government take over Mammoth Cave as one of the wonders of America.

The hotel afforded tourists an idea of what life was in Kentucky a century ago. Many held a sentimental attachment for the primitive old structure because of memories associated with visits to the cave. For many of the older persons Mammoth Cave was the scene of the bridal trip as it was a favorite center for honeymoons in earlier days when long trips were not so easily made. Countless numbers of antebellum bridal couples were its guests.

The hotel was a huge structure of logs weatherboarded. It sprawled over the ground in the manner typical of the buildings of the days in Kentucky when there was plenty of space and when timber could be had from the surrounding forests in unlimited quantities. There will be no interruption to business.

DECKER TOP CO. CHANGES

Detroit, Dec. 8—The Decker Auto Top Co. has bought the Universal Car Equipment Co., dropping its own name in favor of that of the purchase. The combination will do business as the Universal Car Equipment Co. and has moved into a factory of its own. The capital has been increased.

NEW FIRESTONE APPOINTMENT

Akron, Ohio, Dec. 9—L. G. Fairbank has been appointed Eastern district manager for the Firestone Tire & Rubber Co.

Mr. Fairbank has been assistant advertising manager of the Firestone company for the last 3 years. He succeeds D. C. Swander, the latter going to Boston as manager of the local branch.

GRANT CORP. MOVES

Cleveland, Ohio, Dec. 9—The Grant Motor Corp. marked the opening of its fourth year by removal from Findlay to its new factory at Cleveland, Ohio.

The new Grant plant has an annual capacity of 20,000 cars, and if the four factory buildings were placed end to end, they would measure more than a third of a mile.

TO SHOW IN FRANCE

Detroit, Dec. 8—The Scripps-Booth car will be exhibited at the Lyons, France, fair in December. The exhibition is made up of the manufactured products of France, and it has been started during the war with the idea of making it the big event of the year after peace comes.

For years Leipzig held an annual show in which all Europe participated. The war has seriously curtailed its activities, and the Lyons fair largely takes its place.



German name may make Russians and French unduly curious about Rickenbacher's passport

Rick Is Europe-Bound Expected to Bring Back Cars; Name Withheld

EDDIE RICKENBACHER, who finished third in the campaign for the 1916 championship, will receive his \$2,500 in prize money by proxy at the banquet to be held at the Chicago Automobile Club on the night of February 1 when Dario Resta will be crowned king of speed.

With passports permitting him to visit England, France, Italy and Russia, Rickenbacher will sail from New York for Europe on December 15, being commissioned by his wealthy backer, William Weightman III of Philadelphia, to purchase two or three racing cars in the war-swept countries of the old world.

Although of Swiss origin and a native son of Columbus, O., Rickenbacher, because of his German-sounding name, anticipates having some trouble with the spy hunters and for that reason regards his European trip as anything but a journey of pleasure.

Rickenbacher refuses to identify the foreign cars that he hopes to purchase, but it is believed that one of the mounts he is after is the 300 horsepower Fiat with which Duray covered a kilometer at a speed of 143 miles an hour at Ostend in 1914. The big Fiat now is owned by a Russian nobleman and is either in the Fiat shops in Italy or housed in a royal garage at Petrograd. As Rick carries a Russian passport, it is believed that he will trail this Broddingnagian speed creation into the land of the czar in hopes of obtaining it for use as a stunt and record-seeking car in this country.

"Somewhere in France" are four of the five Mercedes that were built for the French grand prix of 1914 and it may be that Rickenbacher will make a bid for these cars as they are about the only European-bred mounts of recent manufacture that have not been brought to America, all of the grand prix Peugeots and Delages being campaigned here last season.

In fact, the only possible cars that Rickenbacher may obtain across the Atlantic with the exception of the Mercedes are the English Sunbeams, which were not for sale this year. It is understood Rick was approached to drive the Sunbeams in America next year.

TIRE PRICES TO INCREASE

New York, Dec. 9—Tire manufacturers are planning a substantial advance in prices for next year. The exact amount is not known at this time but it is said to be between 15 and 20 per cent. Early in 1916 the price of tires advanced 12½ per cent. High cost of materials is responsible for the proposed increase. Fabric is selling at heavy advance over last year's figures and crude rubber is commanding exorbitant prices. The average increase in the cost of material used in tire construction is 20 per cent.

FEDERAL ROAD MILEAGE LARGE

Washington, D. C., Dec. 9—Nearly 5,000,000 square yards of roadway, the equivalent of 561.9 miles of road 15 feet wide, were constructed under the supervision of Federal road specialists during the last fiscal year.

This is more than double the mileage so constructed in previous years. The roads constructed under supervision of the office include experimental roads, post roads, county roads, and roads in National Parks and forests. The expenditures of the office for this purpose were chiefly for engineering services and supervision, the communities, except in the case of forest and park roads, meeting the bulk of the costs for material and construction.

ATLAS TRUCK PLANT SOLD

York, Pa., Dec. 9—The development of the business interests of the Martin Carriage Works, manufacturing the Atlas truck, is forecast in the sale of the plant last week by the Guardian Trust Co., executor of the estate of the late M. D. Martin to Frederick M. Small, York, Pa., and John J. Watson, a New York capitalist. Approximately 99 per cent of the stock of the York concern is now in the hands of the new owners, and options have also been secured on the balance.

Of the total issue of 3,000 shares of stock, 2,455 were held by the executors and were sold to the new owners for \$216,531, or at the rate of \$88.20 a share. The plant covers an area of approximately 5 acres and at present employs nearly 500 men. A big expansion is considered.

Education Better Than Punishment

Vehicle Operators Should Be Treated Kindly by Court if Principles of Safety Are to Be Encouraged—Safety First Federation Told by Judge Sabbath, Originator of Chicago's Speeders' Court, that Penalized Drivers Are Worst Repeaters, While Those Who Are Made to Realize Their Debt to Society Usually Reform

By William K. Gibbs

BALTIMORE, Md., Dec. 7—That education of the car or vehicle operator will do more toward the elimination of accidents than punishing them for traffic violations was the keynote of the second annual convention of the Safety First Federation of America which began here today. While this thought predominated throughout the meeting, the speaker who brought this out most forcibly was Judge Joseph Sabbath of Chicago, originator of the Chicago speeders' court and now a judge of the superior court.

Made Close Study of Traffic

By reason of his experience in the speeders' court and the study he has given traffic problems in Chicago, Judge Sabbath is as well, if not better, informed on the traffic situation generally than any other individual in the country and his message to the convention proved of great interest. Judge Sabbath left no doubt in the minds of those present as to the benefits a large city can derive from the establishment of a separate tribunal to hear violators of the speed laws and of the several ordinances regulating lights, crossings and traffic in general. He declared that only after one has had real experience in such a court can its real value best be seen.

He tried over 20,000 cases during the period which he presided over the court, and in that time not only gained much experience in the way of law interpretation, but opened a wide vision affecting traffic in general and particularly the dangers incident to motor vehicle traffic in the congested sections of the large cities. He pointed out that with an increase in motor vehicles comes an increase of danger and declared that the operation of motor vehicles in the hands of incompetent, immature, or intoxicated persons, calls for a specialist in dealing with the problem. Last year in Chicago, 296 persons were killed and more than 3,000 injured by motor cars. Judge Sabbath declared that this question presents itself:

"Is it a problem that requires a cold administration of the law, the enacting of fines and penalties, the adding of revenue to the city treasury, or is it something bigger, something that a mere administration of the law does not reach? Is it not a question regarding life and limb that the court is confronted with? I have no hesitancy in saying that the enforcement of fines and penalties is insignificant compared with the real service a judge can



Judge Joseph Sabbath, originator of the Chicago speeders' court

render to the community in such a court if he take the problem seriously to heart and devote himself to a study of the question and urge such remedies as his experience will invent for the protection of life and limb from careless or wanton drivers."

A judge especially assigned to such a court becomes acquainted not only with conditions but with the men engaged in the business of driving vehicles through the streets and learns to judge what violations and what actions are particularly dangerous and how they may be avoided. By a just and patient handling of the individuals brought before him, a judge can secure their confidence and gain their cooperation instead of embittering them against the court and proper regulations.

"It is my experience that the man who is fined and compelled to pay the penalty usually leaves the court defiant. He considers himself squared with the law. His penalty is paid and he owes nothing more to society. If he finds a judge who patiently and earnestly points out to him the seriousness of his offense because of its danger to society, his better self responds. A judge can exact from an individual a promise that he will not in the future offend, and if upon making that promise

he is permitted to leave the court without paying a penalty, he leaves it with an appreciation of his obligation to obey the law and with a determination to help along the work in which the court is engaged."

This is the theory under which Judge Sabbath conducted the speeders' court in Chicago. The law gives a person brought into the speeders' court the right to a jury trial and also a change of venue if desired. Out of the more than 20,000 cases that came before Judge Sabbath, no one asked for a jury trial nor to have their case heard before another judge, and as indicative of the friendly spirit which the Chicago motorists have for Judge Sabbath, engendered by the same manner in which he has handled this class of cases, it might be mentioned that Judge Sabbath is one of the two Democratic judges elected to the Superior Court at the recent election when the city went largely Republican. Judge Sabbath attributes the vote given him to the motoring public in Chicago, all of whom he numbers among his friends.

The judge told of the Safety First Brigade instituted in Chicago in which thousands of vehicle operators signed pledges agreeing not only to refrain from violating the traffic laws, but to help the crusade and declared that only a few have violated the pledge and that the repeaters are not the men who were discharged upon a promise to obey the law, but those who had felt the law's penalty.

Safety First Court's Slogan

Across the front of the bar in the speeders' court, is a banner carrying the words, "Safety First." This is the motto of the court and it impresses all who are brought into the court. Judge Sabbath declared that this has convinced the traveling public and the drivers of the court's earnestness in adhering to the motto and its desire not to punish but to prevent.

He told how Chicago had abolished the system of arrest on view when an offender is stopped by a policeman. Instead the violator is merely given a written notice to appear in court at a certain hour and then permitted to go about his business. He is not required to give bail or divert from his course even long enough to go to the police station. To accommodate defendants as well as the police, special hours are set for trial so that those brought before the court do not have to waste time. As an appreciation of this, 99 per cent of

the defendants appear for trial without the issuance of warrants.

A systematic course of education is undertaken. Judge Sabath declared the court one of the hardest to preside over not only on account of the volume of business, but also on account of the pressure constantly attempted to be brought on the judge by men of influence in the community, also because many times personal friends of the judge are called to appear before him and he faces the unpleasant duty of punishing them as much for their own sake as the community at large. Judge Sabath found time many evenings to visit the men who were engaged in driving motor vehicles, either at the meetings of their unions, or other places of gathering, in the barns of the express companies, or other concerns employing a large number of drivers, carrying to them the message of Safety First and asking for their co-operation.

Through the efforts of the court railroad representatives were called together and as a result a uniform signal system is about to be established at all railroad crossings to eliminate confusion.

Imprison Intoxicated Drivers

Out of the court's study of conditions, it has been able to make many recommendations, chief among which is a law that will make it possible for the court to imprison every driver who is caught driving on the streets while intoxicated. Judge Sabath said:

"I know of no greater danger that confronts pedestrians than a powerful motor vehicle operated by a drunken man. He is a real menace and no mercy ought to be shown him. A law making imprisonment mandatory ought to be on the statute books of every state and should be rigidly enforced."

In conclusion Judge Sabath advocated that no one under 18 years old be allowed to operate a motor vehicle, that the police have power to stop and examine cars to determine their good order, that glaring headlights be abolished from the streets and highways, that the speed of motorcycles be curtailed, that passing to the left of standing street cars be eliminated, that every person driving a car whether owner or chauffeur be examined and licensed and required to carry a license as an identification card whenever driving and when arrested and brought to court that the judge indorse on the back of the card the disposition of the case. This would serve to identify the repeater so that the court would know him and not permit giving the offender another chance. The judge declared that there should be an automatic system of forfeiture or suspension of licenses for flagrant violators and that every large city should establish a special court dealing with traffic law violations.

Many accomplishments toward greater efficiency and a better knowledge of human

life have marked the short, but effective career of the Safety First Federation. This was brought to the attention of the convention by Darwin P. Kingsley, president of the Federation. The Federation aims to deal with the relations of society and government at the particular points where the problems of life are most difficult and the struggle is most intense. It seeks to remind men that human life is still the one thing in the world of real value and that to squander it in any interest is not only morally and economically unsound but almost certain to result in utter inefficiency.

President Kingsley declared that the motor car and the skyscraper are years ahead of their time. He pointed out that

Safetygrams

EDUCATE operators of vehicles rather than punish them for violations of the traffic ordinances. Paying a fine does not cancel the obligation a car operator owes the public, although that may be his impression if a fine is assessed. Operators who pay fines are repeating offenders, while those whom the court educates in the principles of safety seldom are twice before the bar.

—*—
All car operators, whether owner or chauffeur, should be required to obtain a license. If called into court the license card should have a notation made by the judge and repeating offenders should be denied temporarily the right to drive, and if violations come beyond a certain point the license should be revoked for all time.

—*—
Pedestrians should be required to cross streets at right angles and only at designated crossing points. The sidewalks are for pedestrians: the streets for vehicles. The vehicles do not use the sidewalk, why should the pedestrian cross streets in a haphazard manner? At regularly designated crossings pedestrians should have the right of way.

—*—
All vehicles should come to a stop 10 ft. behind a street car that has stopped to take on or discharge passengers, unless there is a safety zone or the street is of sufficient width to allow 8 to 10 feet between the street car and the vehicle passing it, and then caution should be used.

—*—
Slow-moving vehicles should keep to the right. This serves two purposes: 1—The faster vehicle can keep near the middle of the street and thus as far as possible from persons stepping from the walk to the street; 2—Traffic moves with less congestion.

—*—
Motorcycle police should be in uniform to serve their most useful purpose. Preventing speeding is better than lying in wait and then bringing the offenders into court. An accident can happen while the speeder is being overtaken by the policeman.

—*—
Drunken drivers of motor vehicles are a menace. A severe penalty for driving while intoxicated should be meted out to every offender, preferably a jail sentence.

—*—
A prison sentence for driving a motor car while intoxicated is a penalty all courts should impose.

—*—
Never stop with left side of vehicle to the curb except on one-way streets.

—*—
Never pass to the left of a street car or other vehicle running in street car tracks.

one could stand for an hour at Fifth avenue and Forty-second street or at Times Square, or any of a dozen other places in New York, and observe the inefficiency achieved by the blind driving at so-called efficiency. Notwithstanding the flexibility of the modern motor car and the strict traffic regulations more or less rigidly enforced by efficient policemen, one observes the chaos of inefficiency. Traffic crawls. President Kingsley declared that the horse car of 25 years ago made better progress than the powerful modern machines, the energies of which are necessarily repressed by the crush of traffic. Incidentally great peril to life and limb attaches to these conditions.

With present-day cities built fundamentally the same as they were 2,000 years ago, the purpose of the motor car and the skyscraper—that of creating greater efficiency—is defeated. No one thought out in advance how a municipality could be constructed to utilize the pent-up capacity of both these modern developments. Existing municipalities cannot be reconstructed and with both the motor car and the skyscraper centuries ahead of the theories on which cities are built and absolutely at war with the traffic capacity of any city, we are obliged to tinker with the old plan and fit it to the new conditions.

Efficiency Without Safety Is Useless

President Kingsley closed his address with the declaration that efficiency that does not rest on a clearly thought out program, on safety, almost certainly defeats its own purpose. All the muddle in the streets of our modern cities involves perils of life and perils of efficiency.

Efforts to standardize traffic regulations through the adoption of a uniform traffic code drafted by the Street Traffic Committee of the Federation were explained by Lawrence G. Brooks, secretary of the Highway Safety League of Massachusetts. The traffic committee, which is made up of traffic experts from coast to coast, has been studying traffic codes of all the larger cities and selecting the best provisions from each during the last 18 months.

The standard code of traffic regulations indorsed by the Federation contains nothing revolutionary, that is, nothing that is not in force in one or more cities in the United States. It might be mentioned here that fundamentally this code is similar to the Eno system advanced by Motor Age. Subject perhaps to a few minor alterations to conform to peculiar local conditions, this code might be adopted by any city. In addition to, but not as part of the code, are certain recommendations by the committee and by the Federation which go somewhat further than the present traffic regulations. Uniformity in number and gearshifts is recommended, transparently-illuminated number plates are urged, and the Federation goes on record in favor of an examination into the qualifications—mental, moral and physical—for every applicant for a license, and for the permanent



The New York police department, co-operating with the Advertising Club of New York and the local Safety First Association, has started a monster advertising campaign in New York to reduce the great number of street accidents and other dangers incidental to life in a crowded city. The contemplated publicity campaign will be carried on through the distribution of 300,000 Safety First booklets, as shown above, outlining the Don'ts laid down for the guidance of the average careless citizen, the posting up in prominent houses and places of 50,000 posters, and the showing in the motion pictures of the city of over 1,000 lantern slides and motion picture films showing how carelessness and thoughtlessness leads to the loss of life and limb.

disqualification of every operator twice convicted of operating a vehicle while under the influence of intoxicating liquor.

Passing Standing Street Cars

Mr. Brooks gave some statistics on the practice of bringing vehicles to a full stop back of street cars stopped to take on or discharge passengers. He gave some figures showing that the distance back of the standing street car that a vehicle must stop, or the space allowed between the left side of the vehicle and the street car if the vehicle is allowed to pass, differs greatly in different cities, the distance ranging all the way from 4 to 20 feet. He said the committee had come to the conclusion that 5 feet back of the standing street car is ample distance for a vehicle to stop and that where streets are sufficiently wide to allow a vehicle to pass a standing street car with perhaps 8 or 10 feet of space between the left side of the vehicle and the standing car, vehicles should not be held up, but allowed to pass. This would be a move toward the elimination of congestion

and he declared that even though passing to the left of the standing street car might help to eliminate congestion, this practice is dangerous and should not be allowed.

Mr. Brooks said that the practice of car manufacturers during the last 4 or 5 years to equip their cars with headlights of greater intensity, and the increasing number of cars on the streets and highways makes the regulating of headlights imperative. There seemed to be an agreement among those at the convention that too little light is more dangerous than too much. Ground glass lens were declared to impair efficiency, since with ground glass or dimmers not sufficient light is given for driving on any but well-lighted streets. It was pointed out that by proper focusing it is possible to put the range of beam downward which accomplishes two things; first, gets the glare out of the eyes of the approaching driver, and second, illuminates the roadway so that the driver can see properly. This practice of directing the beam of light works very well on level roads or streets, but the difficulty arises when driving on hills.

Attention was called to the Massachusetts' law which requires that the uppermost rays of the concentrated beam of light must not be more than 42 in. above the ground 50 ft. ahead of the car. Mr. Brooks declared that 90 per cent of Massachusetts motorists are endeavoring to comply with the state's headlight law and that the situation has materially improved, although conditions are far from ideal. He declared that the best device is no good unless the proper focus is given to the light, and that when the proper focus is given the problem will be nearly, if not completely, solved.

In the discussion of the merits of the

proposed traffic code of the Federation, Raymond W. Pullman, superintendent of police, Washington, D. C., pointed out that sooner or later everyone must agree that some speeds are reckless and provision will have to be made to designate what is the safe speed at which to travel. There was considerable discussion as to whether or not a vehicle approaching from the right should have right of way or precedence be given north and south traffic. Mr. Pullman urged that rotary traffic be encouraged and said that were it not for the rotary system in Washington, chaos would prevail.

Against Direction of Headlight Beam

Major Pullman took a stand against regulation of headlights by direction of the concentrated beam and gave as his reasons the difficulty to interpret when a light complies with the law. He declared that no police officer and few judges could tell whether or not a light does comply with the law and therefore advocated the use of ground glass or some dimming device. Further he believes the high-power incandescent bulb should be eliminated.

Walter W. Nicholson, commissioner of public safety, Syracuse, N. Y., urged that traffic police be given full control in the matter of handling traffic that greater safety may be attained. He seeks greater authority over pedestrians and advocates that closed cars be equipped with some sort of mechanical signal to indicate when turns or stops are to be made. He implied that perhaps a mechanical signal would be better for both open and closed cars, but in the absence of mechanical signals, he endorsed those advanced by Motor Age: That is, holding the arm straight out to indicate a turn toward the side on which the driver is sitting, a rotary motion of



A New York policeman holding up one of the Safety First posters, through the display of which the police hope greatly to reduce accidents in America's greatest city

the hand to indicate a turn opposite from the side on which the driver is sitting, and one with the forearm pointed up to indicate a stop. Mr. Nicholson suggested that the code rule with reference to headlight regulations be amplified so that an option will be given between the use of a light with a directed beam of light or a minimum candle power bulb.

Licensing Vehicle Drivers

Several speakers pointed the need for licensing and examining all operators of motor vehicles, chief among them being Arthur Woods, commissioner of New York police. As to what gives rise to the necessity for licensing and examining, Mr. Woods outlined the difference between the horse and the motor vehicle. He declared that people have not adjusted themselves to the silence and greater speed of the motor car as compared with the horse-drawn vehicle and that the silence and speed of motor cars is the big difference. In Mr. Wood's opinion, the modern motor car more closely resembles a locomotive than the horse-drawn vehicle. He pointed out that the railroads were doing much to eliminate accidents through fewer grade crossings, and the stationing of guards or the placing of gates, yet motor vehicles, closely approximating in power the locomotive, move about without the general public being protected in any way.

Engineers are required to pass a rigid examination before they are intrusted with the handling of a passenger train, even though they have no control over the train's direction, since this is accomplished by the direction of the track, yet any individual who can get a motor car, may drive it where he chooses and move in any direction he pleases. He drew a simile between the driving of a locomotive up and down the streets without tracks, in charge

of uneducated engineers, and the operation of a motor vehicle by an incompetent.

Mr. Woods gave some figures on accidents on the streets of New York which showed in 1915, 669 were killed, of which 290 were under 16, and 106 under 6 years old. Of the injured during the same period, 2,301 of a total of 23,231 were under 6 years of age. The number of people killed on the street in New York in 1 year by vehicles is twice as great as the number of Union men that fell in the first battle of Bull's Run.

Figures on the killed and injured in the streets of New York through passenger cars running into other vehicles were compared by Commissioner Woods and he showed that the average per month for passenger cars is 493 and motor trucks, 140. Collision between passenger cars and trolleys average forty-four, between passenger cars and horse-drawn vehicles, fifty, and between two motor cars, eighty.

These figures he declares showed a need for licensing drivers and while he admitted that other things were needed, such as proper lights, brakes and steering gears, no matter how adequate these may be, they are useless unless the man behind the wheel can do his part. Inforcement of the law is necessary, but we need to be assured of the driver's competence.

Commissioner Woods said that approximately 14,000 arrests were made last year in New York, but declared the world could not be reformed by punishment. He said that the majority of accidents were not caused by criminally negligent, but rather by careless or incompetent drivers. He declared that arrest and punishment are not efficacious, but the only solution lies in the education of the driver and the withholding of the license to drive until he demonstrates that he is competent.

Dr. H. M. Rowe, president of the American Automobile Association, made some very caustic remarks on the equation between the pedestrian and traffic. He took the stand that motorists are burdened with a lot more law now than they can interpret, while the pedestrian is subject to no law at all, except the law of reason, which he uses very little. Dr. Rowe advocated the elimination of jay-walking and urged that inasmuch as the sidewalk is for pedestrians and is not encroached upon by vehicles, some provision should be made to keep the pedestrian out of the street, which is especially for vehicles at points other than street intersections where pedestrians should be allowed to cross at designated crossings and be given precedence over the vehicular traffic. He criticized the great difference between traffic laws in various cities and rather facetiously remarked that a motorist making a tour of any length taking him through numerous cities found it necessary to carry counsel with him in order to interpret the various ordinances under which he was to drive and then he could not be sure he was right more than half the time.

Pedestrian Hard to Handle

Regulating the pedestrian along with vehicular traffic was touched upon by a number of speakers in the discussion and was looked upon as a rather weighty problem, a solution of which is difficult. It seems that only martial rule would be effective in keeping pedestrians from crossing streets at other than street intersections, although all agreed that were it possible to regulate pedestrian traffic, even approximately to the extent that vehicles can be regulated, one of the greatest steps toward the elimination of street accidents would have been taken.

Apropos of this subject were the remarks of Robert D. Carter, marshal of police, Baltimore, Md., who took the position that Safety First should begin at home and that the whole problem is largely one of education.

He said that parents would perform a public duty if they would instruct their children a few minutes each day in Safety First rules. He declared that a boy or girl on their way to school, or while at play, will remember the safety advice given by their parents more readily than warnings placed on signs or billboards. He advocated that children attending public or private schools be enlisted in the cause of carrying out Safety First rules by the appointing of Safety First squads in their respective schools.

The street traffic problem, he declared, rests entirely with the public. Lives and limbs will be sacrificed until every citizen realizes his responsibility and does his share in making traffic safe. He closed his remarks with a slogan which everyone might well practice on the streets, which is: "Be where you belong."



This shows what may easily happen should parents not caution their children about carelessness. Children suffer the heaviest toll of deaths because they are the most reckless

Educate Car Owners on Battery Care!

This Message Given to Indiana Service Managers in Indianapolis Meeting

INDIANAPOLIS, Ind., Dec. 9—A vigorous campaign to educate car owners and garage repairmen in the proper care of the storage battery was the plea made at the monthly meeting of the Indiana Automobile Service Managers' Association, held here today. In his paper, "The Battery Service Problem," J. Whyte of the Prest-O-Lite Co., pointed out the great need for advertising and the distribution of literature, solicitation of the co-operation of dealers, and when required having first educated them, and co-operation from the car manufacturers in designating the vast importance of storage-battery care by plates placed on a conspicuous place on the car and literature containing warnings and instructions placed where the owner will see it when he first takes his car out.

The really short period in which the storage battery has found application as a starting and lighting unit of a gasoline car has had its effect in a vast number of ruined instruments which have met their ruination simply because the owners of the car or the garagemen who have had it in charge have been ignorant of the care it should have received.

Quoting from the paper of Mr. Whyte:

"Almost any garage in any part of the country is able to give service on the mechanical parts of an automobile, but there is a deplorable lack of knowledge on the part of the average automobile mechanic as to the principles involved in the operation of a storage battery.

"With the application of the storage battery to starting duty in 1912, battery manufacturers were met with the problem of obtaining the maximum capacity from the minimum amount of weight and were also faced with the fact that their product was being turned into the hands of men who were accustomed more to handling mechanical devices than an electro-chemical unit which was sensitive to abuse and neglect.

"In its application to starting and lighting work the battery does not operate under the most favorable conditions. It is subject to heavy discharges and also in many cases to continuous overcharge for prolonged periods.

"It is scarcely believable, but nevertheless true, that there are a considerable number of automobile owners who do not even know where to find the battery on their cars. The first time they realize its existence is when they try to use it and find it discharged. The car manufacturer and automobile dealer should take stupendous steps to correct this condition of things.

"A regulator out of adjustment may cause too high or too low a charging rate with corresponding overcharge or undercharge of a battery.

"Shorts in the wiring, switches or starting motor may allow a slow current leakage which will cause the battery to run down and become discharged.

"In these days of large production of

cars, there exists periods when the available market for the disposal of cars does not equal the rate at which they are being produced.

"This necessitates that cars be held in various quantities in different parts of the country over the winter months, in order to take care of the spring sales without delay in deliveries.

"If cars are shipped in the fall of the year equipped with storage batteries and these are held at various sales points until spring without the batteries being removed from the car and properly taken care of, the majority of these batteries are going to depreciate very rapidly as soon as they are placed in service.

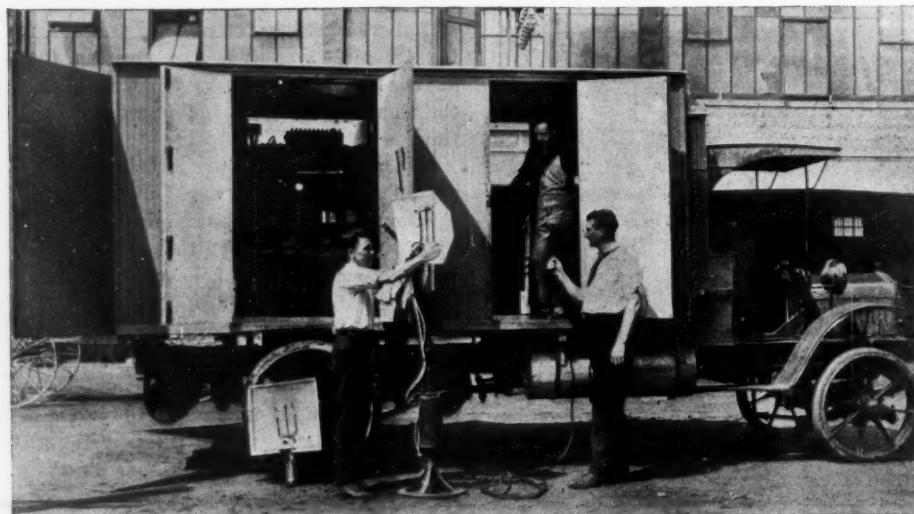
In his paper, "Proper Care of Batteries Held in Storage," H. S. Bentley of the Willard Storage Battery Co., said, "Because of the failure of motor car dealers to give the storage battery a proper chance for its life, by neglecting to turn it over to a customer with a full charge, at least 75 per cent of all future storage battery troubles are born. If he knows the battery is half or more discharged, he quiets his conscience by thinking that the generator will build it up to the condition of full charge. This may happen in a few cases, but in most cases the current produced by the generator will not be sufficient to any more than replace the current used for every day lighting and cranking. Consequently the battery continues in a more or less starved condition for several weeks or months, and ultimately goes dead. Reforming may restore it to serviceable condition, or new insulation may be necessary.

"We come to the question of the means which a dealer should take to preserve these batteries from deterioration so far as possible.

"First of all manufacturers should arrange with their dealers to ship them 'export' or 'dry' batteries with all cars to be stocked during the winter months. These batteries are prepared without electrolyte, and if kept in a moderate temperature of from 35 to 60 deg. will need no further attention, and will not suffer deterioration to any degree."

TRUCK SHOPS READY SOON

Fort Sam Houston, Texas, Dec. 8—The motor truck machine and repair shops which the United States Government is constructing for the army at Fort Sam Houston will cost approximately \$45,000. One of the interesting features of the construction work is that compressed steel units are being used in the erection of the buildings. It is said that this is the first time this method of construction has been used by the army, and it is largely in the nature of an experiment. More than 32,000 lbs. of steel and iron will be required in the construction of the different units. Remarkably good time was made in putting up the first building. It is 150 ft.



Satisfying the taste of the movie-going public for frequent changes of programs has speeded up the duties of the film producers, necessitating outdoor motion picture photography at night. At first the problem of proper lighting caused the producers considerable inconvenience, because at many outdoor locations where motion pictures are made at night there are no nearby electric lines that can be tapped for current. The Vitagraph Company of America has solved this problem by providing a portable lighting system, consisting of an electric generator mounted on a White 5-ton motor truck. This outfit can supply sufficient light for the filming of night scenes in the largest productions and the truck, because of its ability to travel over any kind of roads, can reach any desired point

long and 50 ft. wide and was erected in 24 hrs.

One of the advantages of this mode of construction, according to the contractor, is that the building or any of its units may be taken down and carted to another location with little trouble or loss of time. The machine shop is composed of fifteen units.

The total approximate weight of each unit, not including window sashes, is 900 lbs. This could easily be loaded upon a motor truck and carried to any other location desired. The repair and assembling buildings are to be constructed along the same lines. The entire plant will occupy an area about the size of a city block.

PROMOTIONS AT HUPP CORP.

Detroit, Dec. 8—Lee Anderson has been appointed vice-president of the commercial division of the Hupp Motor Car Corp. Mr. Anderson was formerly the advertising and commercial manager. DuBois Young has been appointed vice-president of the manufacturing division.

MAXWELL MAKES PROMOTIONS

Detroit, Dec. 8—T. J. Toner has been made director of sales for the Maxwell Motor Corp. Mr. Toner was formerly the Pacific coast zone manager. C. E. Stebbins, formerly assistant sales manager, has been promoted to the position of assistant director of sales. Charles Gould, formerly service manager, has been made sales manager, and G. S. Gamble has been appointed assistant sales manager.

TO MAKE CARBURETER DEVICE

New York, Dec. 9—The Doyle Fuel Regulator Co. has been organized to manufacture and market a device that is designed to make any type of carbureter with an adjustable needle valve automatic in its operation. The device will sell for \$5 and can be attached in a few minutes. W. H. de Fontaine heads the new company. Other officers are: Vice-president, J. M. Doyle, and secretary-treasurer, A. Ross Jarman. The device is to be placed on the market at once.

DENMARK TRADE INCREASES

Washington, D. C., Oct. 9—Copenhagen advices state that the increase of motor cars registered in Denmark show a good market for motor cars of all descriptions. Sept. 1 there were 5,718 against 4,331 a year previous and 3,430 in 1914. Since the war began the number has been increased by 2,288 cars. Copenhagen has 2,128 of the cars registered. A comparison of cities and rural districts, however, shows that the increase from 1914 to 1916 is largest in the rural districts and smallest in the capital. Of the makes of more than 5 h.p. registered Jan. 1, 1916, seventy-five were Danish, forty-five English, 588 American, 303 French, and 1,008 German.

Tax Dodgers in Colorado Pay Up

Total of \$21,000 Gained for Road Use by State Officials

DENVER, Colo., Dec. 8 — Twenty-one thousand dollars added to Colorado's highway revenue from the state license tax on motor vehicles is the record of this year's license inspection, which uncovered 7,541 cases of attempted law evasion. Last year, when the inspection did not start until June, 4,090 cases of non-registration or wrong registration were found, and the additional fees thus brought into the state and county road funds amounted to \$12,250.

The state law passed 3 years ago requires a yearly license fee of \$2.50, \$5 and \$10 respectively, for cars up to 20 hp., from above 20 to 40, and above 40 hp. Dealers pay a flat rate of \$5 regardless of horsepower. When an owner's license is re-issued for a different car from the one originally registered, the law requires a transfer fee of 50 cents, and also whatever additional fee might be called for by a greater horsepower rating. A driver's license costs \$1. The motor vehicle law further provides that all this license revenue—which also includes \$2 each for motorcycles, shall be divided equally between the state road fund and the road funds of the respective counties as they make returns to the secretary of state. For this reason, motoring and good roads organizations, public-spirited car owners and enterprising dealers are glad to co-operate with the state authorities for the enforcement of the license law, which calls for moderate fees in comparison with those required in many states.

Secretary of State Ramer and Chief Li-

cense Inspector De Lochte say that this class of tax dodging seems to have a peculiar fascination for many people, or else there is an absurd prejudice against paying a motor vehicle license fee, for they find an amazing amount of attempted evasion on the part of persons who surely have too much money to object from the standpoint of expense, and who have too much dignity and respectability to stoop to fraud for the small sum involved.

The different forms of failure to obey the registration law, and the withheld fees collected by the inspection work, are classified as follows by Inspector De Lochte:

2,781 car owners.....	\$11,615
413 dealers	1,865
2,151 drivers	2,151
1,610 re-issues	4,988
586 motorcycle cases	1,143

7,541 violations

\$21,762

While Secretary of State Ramer feels that this showing does not flatter the motoring citizenship of Colorado, he is proud of the success of his department in preventing the loss of this money due the state for road improvement purposes, and he also praises the Denver Motor Club, the Colorado Good Roads Association and the Automobile Trades Association of Colorado for their support of his campaign against this kind of tax dodging. Inspector De Lochte has made 40,615 inspections in the 2 years, and the cost of collecting the \$34,012 has been taken care of by the regular allowance of 10 per cent for operating all branches of the department of secretary of state. This inspection record is considered exceptionally good from an efficiency standpoint.



The San Francisco Examiner has equipped a car with all the paraphernalia necessary to give a movable movie show and is to use the equipment to put cheer in the hearts of members of the National Guard of California now stationed on the border

Carbureters Meet New Demands

Improved Economy, Acceleration, Pulling Power at Low Speeds and Easier Starting Among Features of Latest Instruments

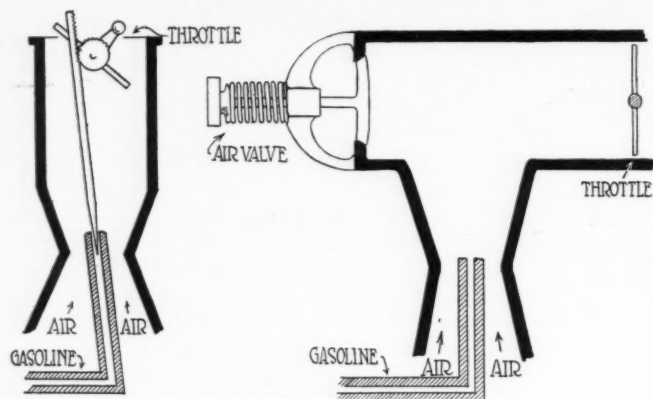


Fig. 1—Principle of the metering pin, showing the pin connected with the throttle and closing the nozzle. The necked-in air passage is the venturi

Fig. 2—Principle of the air-valve type of carburetor, showing the gasoline nozzle in the venturi tube, through which the air sweeps, picking up the gasoline. Extra air valve, at left, opens at high speeds

Basic Principles Explained — 1917 Designs Described and Illustrated with Methods of Adjustment of More Widely Used Types

CARBURETER manufacturers during the past season have made distinct steps along four different lines, and all of these have been made necessary by the demands of the manufacturer of the motor and car and the user on the one hand, and the deterioration in the quality and uniformity of the fuel which they have to handle on the other.

Plea for Low Consumption

Manufacturers this year are echoing the call of the motor car user for carbureters which will show in their engines lower gasoline consumption, better acceleration, easier starting and better pulling power at low engine speeds. Numerous economy tests during the past year have awakened motorists and car manufacturers to possibilities of obtaining greater mileage on a gallon of fuel. Above all, the high price at which gasoline has been marketed has made the demand for greater economy imperative. At the same time, the lower grades of fuel—by which is meant not so much lower gravity as higher boiling points and less uniformity in the range of boiling points of different fractions of the fuel—has made necessary that special arrangements be provided in the carbureter to provide economical running.

In meeting this demand, carbureter makers have resorted to arrangements which will permit the carbureter to be operated normally under its most econom-

By Darwin S. Hatch

ical mixture, but which automatically enriches the mixture when necessitated by requirements of increased speed, starting or acceleration.

An example of what has been done along this line is the economizer applied to the passenger car models of the new plain-tube Stromberg. Zenith, Rayfield and Carter have accomplished similar results by other means, while a fifth maker among the leading ones soon will bring out a dis-

tinctly new model in which a similar feature is predominant. Most of these are designed so that the ordinary running mixture can be cut down thinner than formerly has been the case, because they have provided means, such as accelerating wells, dash pots, and extra jets, for giving the additional gasoline required on exceptional demands.

Increasing Heat of Gas

Much has been accomplished toward handling present-day fuels with their higher boiling points by increasing the heating of the carbureter—chiefly by arranging for the majority of the air taken in through a stove around the exhaust manifold. Incidentally, motor manufacturers have helped considerably in this by designing their motors so that there is no exterior manifold, all of it being within the cylinder casting. This goes a long way towards preventing re-condensation or precipitation of the gasoline in the mixture after it leaves the carbureter.

One of the chief difficulties which have been occasioned by the decrease in volatility of the fuel has been difficulty in starting, particularly with a cold engine. A number of the carbureter manufacturers have overcome this by introducing arrangements for spraying gasoline, either raw or mixed with a small quantity of air, directly into the manifold above the throttle, so that under closed throttle con-

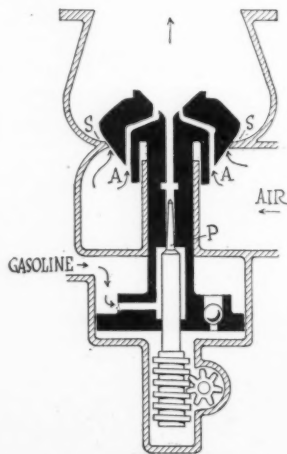


Fig. 3—How the metering pin P varies the mixture in the Stewart. Air passes through the passages A around the nozzle

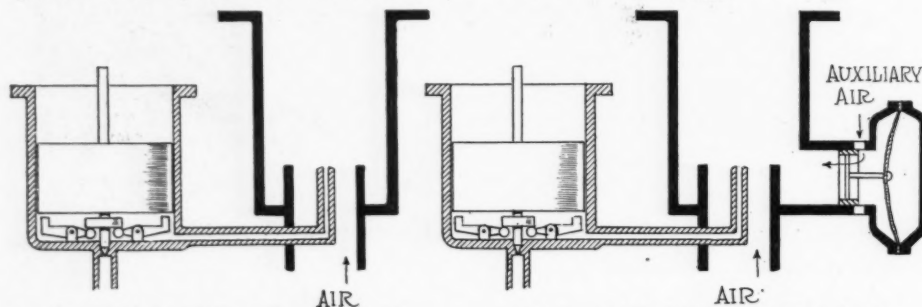


Fig. 4—The Maybach, earliest and simplest of modern carbureters

Fig. 5—Krebs added an auxiliary air valve for high speed air

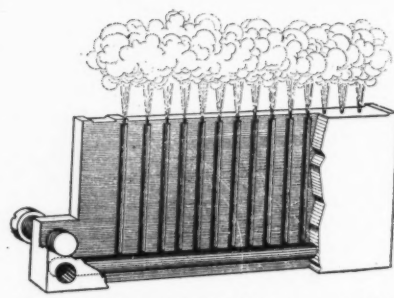


Fig. 6—The multiple jets of the Master carburetor

ditions the suction above the throttle will be sufficient to force sufficient gasoline into the lower end of the manifold to give a very rich mixture for starting. Among the manufacturers who employ such arrangements are: Rayfield, Stromberg and Zenith, while the fourth leading manufacturer embodies this principle in a new model shortly to be announced.

Along with the arrangements for heat-

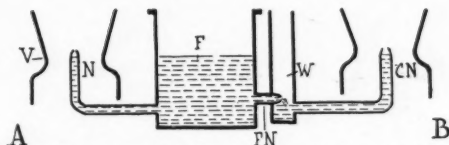


Fig. 7—Illustrating the principle of the compensating jet type of carburetor

ing the manifold, particularly those in which the carburetor is attached directly

to the cylinder casting, the horizontal type of carburetor which made its appearance in numbers a year ago has become even more prominent. Its advantages, aside from the fact that a manifold is within the water jacket space and is very short, are that it produces a very clean-looking engine and reduces the chances for manifold leaks. The short manifold is a feature to discourage gas condensation.

Carburetor Types and How They Operate

First Principles of Construction

BEFORE considering any carburetors as they have been developed to meet new conditions, it will be well to consider the basic principles upon which the carburetor acts. The liquid fuel is led from the main fuel tank into a compartment of the carburetor called the float chamber. This is simply an auxiliary tank of small capacity in which the level is kept at a constant height by means of a metal or cork float which when it rises to a certain point, closes the valve, admitting the liquid to the float chamber and below this level, opens the valve which admits it until the float rises to the closing level. It is illustrated in Fig. 4. The carburetion itself, that is, the mixing of gasoline with air, is accomplished by leading the gasoline from the float chamber through a passage or passages having outlet at approximately the level of the fuel in the float chamber and in the path of air drawn into the engine through the manifold or intake passages of the engine, the air being sucked in by the vacuum created by the downward movement of the piston in the cylinder. The rush of air past the opening in the gasoline led from the float chamber sucks out the gasoline and carries it upward with it into the engine. The suction in the carburetor, and thus the quantity of the mixture, is varied by opening and closing a valve called the throttle.

The earliest carburetor in which the new principles were incorporated was the Maybach, Fig. 4, developed in Europe in 1893. It employed all of these principles, a float-chamber, the spray nozzle in the air passage, and the controlling throttle. This type of carburetor operated satisfactorily with the easily evaporated fuel of that day and the almost constant speed of the engine, but when the motor speeds increased, this type proved inadequate. If the nozzle was of such size that it gave a good mixture for low speeds, it was too rich in gasoline vapor at the higher speeds due to the increased air velocity to pass the nozzle or jet, which increased the rate of flow of gasoline in proportion to the volume of air.

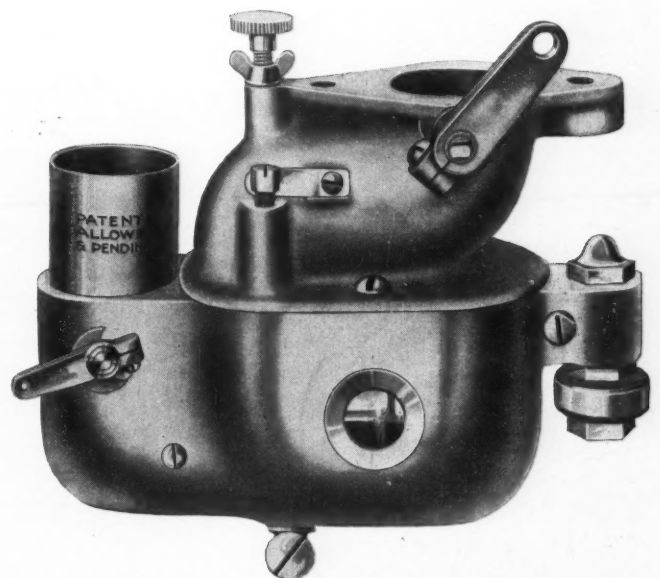
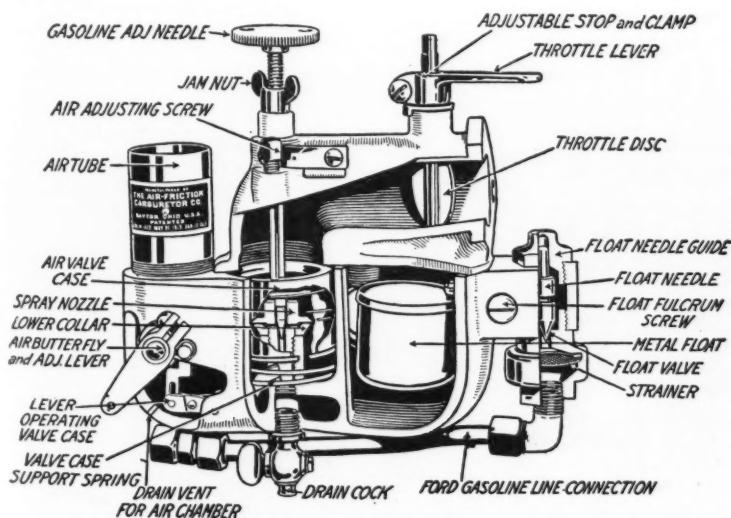
Adding Auxiliary Air Valve

In order to overcome this, the next important step in carburetion was made by the addition of the auxiliary air valve, Fig. 5. By this is meant an automatic valve that permitted additional air to be drawn into the mixture above the jet at high speeds so that the too rich mixture is weakened by this additional air. Credit for this feature of the carburetor has been ascribed to Krebs, an engineer of the Panhard company, France. There are a number of carburetors on the market today based entirely on this principle and

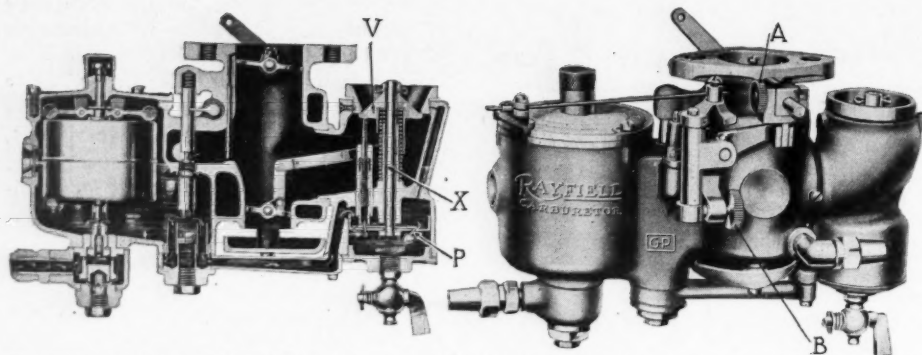
depending entirely on the auxiliary air valve to regulate the richness of the mixture while the motor is running. Most of them have, however, what are called adjusting metering pins or needle valves, located in the nozzle, and which can be set to admit more or less gasoline. Such carburetors can be classed generally as the air-valve type. Air-Friction and Breeze carburetors are of this type.

Another classification is the type in which some form of metering pins are placed in the nozzle and provision made to lift this pin by raising or lowering it. The metering pin is like a pointed lead pencil, made with different degrees of taper to supplement the auxiliary air valve, the air valve perhaps caring for the high speeds and the metering pin for intermediate speeds, while idling and low speeds are taken care of in other ways.

Controlling the metering pin is accomplished by various methods. In one design it is raised by the throttle; in another by the auxiliary air valve, and in a third by an air valve within the mixing chamber. In the Model T Schebler, Fig. 14, the metering pin is controlled by the auxiliary valve; when the valve moves downward in opening, it carries the metering pin with it, the latter being designed to increase the jet as it is lowered. The



Figs 8 and 9— Internal and external views of the Air Friction, a typical air-valve type of carburetor. The chief parts of the instrument, most of which are common to all carburetors, are pointed out



Figs. 10 and 11—The Rayfield model G, a good example of a carburetor employing more than one method of mixture control. These also illustrate the latest refinement in the Rayfield, that of arranging the metering pin to ride between the air valve V and the dashpot piston P

air valve in this model is controlled by a dash pot and spring.

In the Stewart the metering pin is regulated by a metering air valve which controls the metering pin.

Multiple Jet Type

A third division of carburetors is that usually called the multiple-jet type, although the words "expanding type" perhaps are better. The Master, Carter and Sunderman carburetors are examples. This consists of bringing into operation additional jets as the demands of the engine require. The Carter hardly corresponds with this, as instead of additional jets it has a single nozzle which is a vertical standpipe with holes drilled in the form of an ascending spiral, and as the demand increases gasoline issues from a greater number, as the gasoline rises higher in the standpipe.

A fourth class is known as the compensating-jet type. This has been much in vogue in Europe, and has been in the public eye in America during the past 2 years, due to patent litigations between Stromberg and Zenith, the leading exponents of this design. Longuemare, Holley and other designs employ modified forms of this principle. This type is practically free from moving parts with the exception of the throttle, and is the simplest form of carburetor.

The principle of the compensating jet

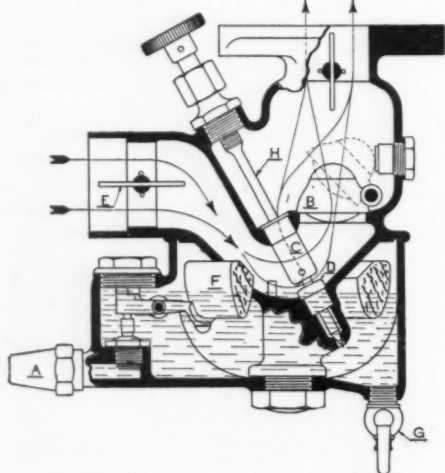


Fig. 12—Kingston model L, in which the arrows indicate the direction of the air flow under the action of the weighted air valve B

type is illustrated in Fig. 7. This illustration is made up of three parts, parts A and B showing the two elements which are incorporated in the complete carburetor. This compensating jet type may be described as a two-fold type: Part A shows a float chamber to the right with a nozzle N leading into the venturi-shaped mixing passage V at the left. This part practically corresponds with the original Maybach carburetor design. It is simply a fixed nozzle located in a fixed air passage. The part B at the right illustrates the compensating feature. Here is what is termed a compensating nozzle CN in an air passage. This nozzle does not communicate direct with the float chamber F, but leads into a well W, which receives its supply of gasoline through a fixed nozzle FN in the float-chamber side. This well W is open to the atmosphere at the top. Its modus operandi is: When the motor is idle the gasoline is at the same level in the well W as in the float chamber F and also in the nozzle CN. With the acceleration of the motor the supply in the well W is soon consumed, after which air is drawn through the nozzle CN along with the gasoline, and it is this fact of air and gasoline being fed through this

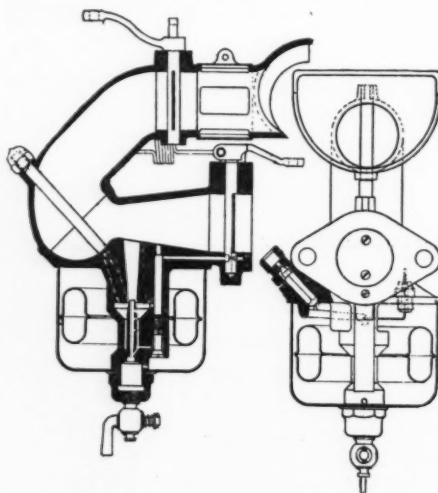


Fig. 13—Two views of the new model L Carter, a multiple jet type having a single nozzle, the fuel passing out through holes in the nozzle

Fig. 14—Schebler model T. As the air valve at the top opens, it depresses a metering pin opening the nozzle

nozzle which gives it the name of the compensating nozzle, the air being the medium which mixes with the gasoline and reduces the richness of the mixture.

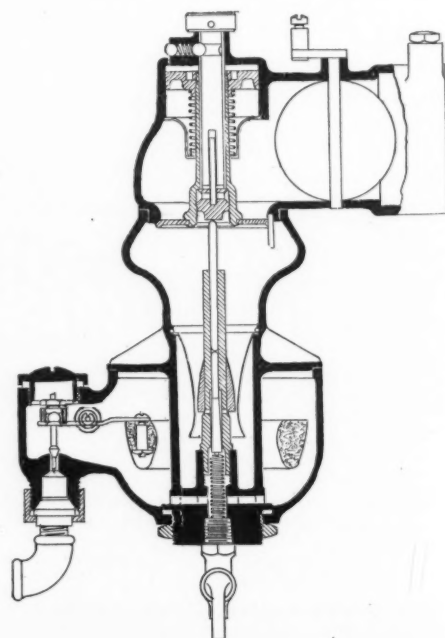
Thus combining parts A and B we have a two-fold carburetor, such as the Zenith. The new Stromberg Model L plain tube carburetor employs a similar principle, using two venturi tubes and other features described in detail on other pages.

Several of the leading types of American carburetors cannot be classified definitely under any one of the four classes explained above. Some of them combine features distinctive of two or more of these classes. Rayfield, Kingston and the older models of Stromberg exhibit the characteristics of one or more of the above classes. Just how these individual carburetors of the mixed classes combine these features is brought out in the individual descriptions on other pages.

The Venturi Tube

One of the greatest steps in the progress of the carburetor was the utilization of the venturi-tube in increasing the rapidity of flow of the air past the nozzle. This principle is not a new one, having been applied first by an Italian, Venturi, in the eighteenth century. He found that a fluid would flow through a necked-in tube of proper shape more rapidly than it would through a straight tube. This principle is applied to most modern carburetors in some form or other. The venturi usually is applied so that the smallest diameter of the tube comes just below the nozzle, and the increased speed of flow utilized to pick up the gasoline. Some designs, such as the new Stromberg, employ two venturi tubes.

It has been found that a plain air valve with a single spring holding it to its seat often is too delicate and too responsive for efficient use because it will be continually fluttering. To overcome this, manufacturers use compound springs and



other means. Some have employed dash pots in which the action of the valve is retarded by a piston operating against a cushion of air or gasoline. Some, such as the Rayfield, have gone even further, and have utilized the gasoline in the dash pot to give an added flow through the nozzle. When the air valve is drawn down by an increased pull of the open throttle, a piston connected with the air valve forces additional gasoline into the jet, thus temporarily increasing the flow of gasoline for quick acceleration and added power.

The high price of gasoline during the past year or so and its gradual approach to kerosene in quality has given added impetus to the development of the so-called

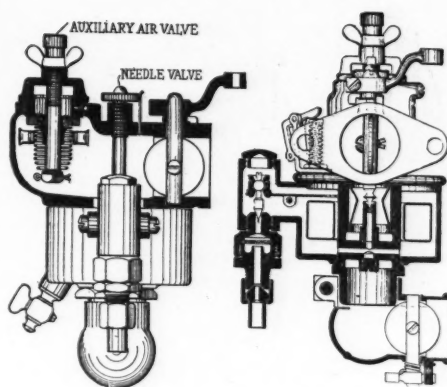


Fig. 15—Breeze carburetor, described by the makers as an automatic-aspirating type

kerosene carburetors, and a number of these have either been placed on the market within the past year or older ones have been developed to a point where some of them at least are really worthy of consideration.

Most of the arrangements for using kerosene as a fuel for motor car engines involve the employment of what amounts to two carburetors, though they usually are connected to either so that they are a unit. This becomes necessary from the fact that kerosene is a very sluggish fuel when cold, and that it is necessary to bring it up to a fairly high temperature before sufficient vaporization takes place to get it into the engine in ignitable form.

Operating Details of the New Carburetors

Classifications by Type and the Changes of a Year

Air Valve Type

AIR-FRICTION—Air Friction carburetors, made by the Air-Friction Carburetor Co., Dayton, Ohio, are of the air-valve type in which the auxiliary air valve is expected to maintain the proper proportions of gasoline and air. There has been only one change for 1917, and this consists in an improvement in the spray nozzle. Holes are drilled in the lower collar of the nozzle, which gives improved economy, starting and idling.

The flow of gasoline is regulated by an adjusting needle at the spray nozzle. The air supply can be controlled from the dash. The design enables low-grade fuels to be used with what are said to be excellent results, and many users are employing a mixture of half kerosene and half gasoline.

K-D—The K-D, produced by the K-D Carburetor Co., Cleveland, Ohio, is an extremely simple instrument in which there is but one adjustment. Air entering the intake lifts a ball, which permits the proper amount of air to enter, in proportion to the speed of the motor. As the air enters it picks up fuel from a single nozzle, which projects into a venturi.

Breeze—The Breeze, produced by the Breeze Carburetor Co., Newark, N. J., is described by the makers as belonging in the automatic aspirating type. In principle it is a simple air valve type. The incoming air passes through a venturi enclosing the fuel nozzle so that the suction determines the quantity of fuel drawn through the nozzle. As the mixture would be too rich at high speeds without the addition of more air, there is an auxiliary air valve controlled by a spring.

Zephyr—The Federal Brass Works, Detroit, has added the ball valve type for 1917. This is the plain tube Zephyr of previous design with the pilot jet eliminated and a ball valve on the intake. The object of the change is to secure better atomization of the heavier gasoline. The standard type is being continued. The flow of fuel by a rotating tube that carries four jets, the lower one of which registers with the fuel passage. Uniform partial vacuum is maintained by properly shaped air passage. The jet of air at right angles to the feed in the atomizer is depended upon to atomize the fuel. The air should be moderately pre-heated.

The shape is formed like a T, with the stem horizontal and the cross, or top of the T, vertical. This vertical member is a straight air passage at the bottom of which

is the air intake and at the top, the attaching flange. In the new model the ball valve is seated at the bottom of the tube, or air intake, with a smaller air intake above it, so that primary air is taken above the ball and auxiliary secured by lifting the ball with the vacuum of the engine. The air through the primary opening is heated, and through the main opening below the ball, is cold.

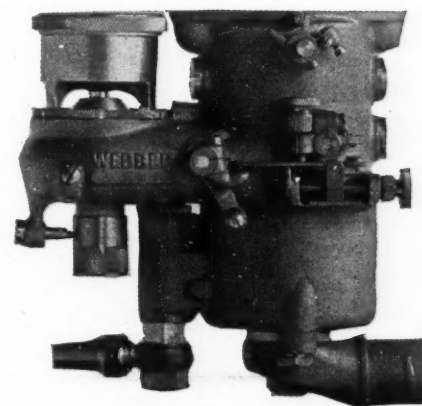
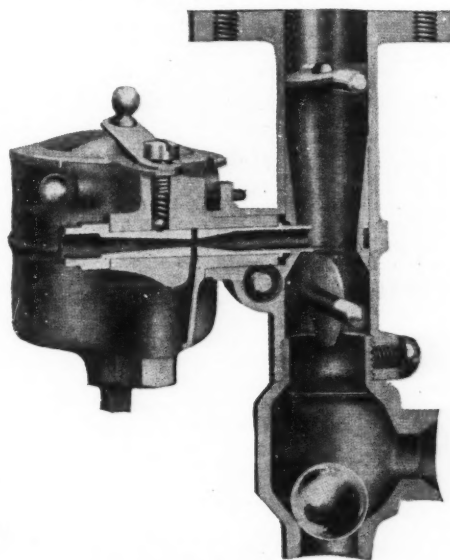


Fig. 16—Above—The Zephyr ball-valve type, changed from the pilot-jet type to secure better atomization. Below—The Webber has the nozzle in a venturi

The atomizer and jet run from the float bowl into this air passage at right angles, and the velocity of the air over the interior end of the atomizer creates sufficient vacuum within it to spray the fuel into the venturi-shaped mixing chamber. The atomizer has four different jet openings, which line up with the intake from the float chamber. The adjustment is made by turning it until the proper opening is in line. A throttle jet, which is in the form of a tube running above the throttle, acts as an easy starting device and idling feed, on closed throttle. A starting shutter in the bottom of the air tube throws all the suction on the atomizer and insures a good starting mixture. The type is not generally used with full hot-air feed, the hot air being only on the primary.

Browne—The Browne is marketed by the Holt-Welless Co., New York. It is controlled directly by suction in the venturi. The auxiliary air valve is an aluminum cup held on its seat by a spring and sucked open in proportion to the speed of the engine by the rush of air past an opening directly opposite the fuel nozzle. Therefore, any change in the fuel flow automatically changes the quantity of air mixed with the fuel. The size of the venturi and of the auxiliary air inlet is changeable and is determined by the piston displacement of the motor. There is but one adjustment, and this is at the needle valve.

Branford—The Branford, which is produced by the Holt-Welless Co., New York, belongs in the weighted air valve class, in which the vacuum within the body of the carburetor is maintained constant. The fuel is drawn up through the center of this weighted air valve and issues from openings around the valve at the point of greatest constriction of the air admission areas. The velocity of the air is greatest at this point, and the fuel therefore finally is broken up and thoroughly mixed with the air.

As the amount of fuel picked up is governed by the velocity of the air passing the fuel nozzle, and the velocity in turn is controlled by the vacuum, which remains practically constant. The quality of the mixture does not change with the change in volume required by the motor.

At present but one size, for Fords, is made, but at the New York show there will be on exhibit a full line operating on the same principle and intended for all makes of cars. These will be exactly like the present type, except for slight changes necessary to permit of attachment to the various other cars.

There is only one adjustment and, once

made, this need never be changed. After the carburetor is installed, turn the adjusting screw up or down until the motor idles properly. An ingenious by-pass from the body of the carburetor to a point directly at the throttle is merely for starting and provides a very rich mixture. The valve is spring-closed, and as soon as the motor starts, this by-pass becomes inoperative.

Metering Pin Types

Schebler—Wheeler & Schebler, Indianapolis, have a new model near perfection, and it will be announced shortly. It incorporates special features designed to give easier starting, better acceleration and greater economy with present day fuel. No further information can be given on it at this time.

Aside from this, there are no new models. Models R, L and P are carried over. These may be termed over-compensated metering-pin types in which the needle is lifted with the throttle opening to a greater extent than normally would be required and over-compensated by the air valve.

The needle is hooked to the air valve and when the latter lifts it lifts the needle. This applies directly to the Model L, and the Model T is the inverted type of Models L and R in which the needle is depressed to open. Proper atomizing of the fuel is provided by the velocity of the air carrying the fuel off the nozzle and by maintaining as big a velocity as is possible by design of the air passage and by heating the air.

The Model R is a single-jet instrument using two air inlets, one fixed and the other automatic. The automatic valve controls the lift of the single needle valve, and in this way any extra air taken in will cause additional gasoline supply to be carried in also. As motor speed increases and the air valve opens, more fuel is added to keep the mixture constant.

The Schebler Model L is operated on the same principle as the R, using a needle valve controlled by the auxiliary air valve.

Stewart—The Detroit Lubricator Co., maker of the Stewart, offers no new models and no changes. The type is a metering type in which the vacuum at the jet is controlled by the weight of the metering valve surrounding the upright metering pin. The only moving part is the metering valve, which rises and falls with the changes in vacuum. The air chamber surrounds the metering valve, and there is a mixing chamber above. As the valve is drawn up, the gasoline passage is enlarged on account of the predetermined taper on the metering pin, and the air passage also is increased proportionately, giving the correct mixture. A dashpot at the bottom of the valve checks flutter. In idling the valve rests on its seat practically closing the air and giving the necessary idling mixture. A passage through the valve acts as an aspirating tube. When the valve is closed altogether the primary air passes through ducts in the valve itself, giving the proper amount for idling.

The one adjustment consists in raising or lowering the tapered metering pin, increasing or decreasing the supply of gasoline. Dash control is supplied. This pulls down the metering pin, increasing the gasoline flow.

The duplex type for motors is the same in principle as model 25 but it is a double carburetor synchronized as to throttle movements, adjustments, etc. A duplex for aeronautical motors is made of cast aluminum alloy.

Marvel—The Marvel Carburetor Co., Flint, Mich., has added a new model F. This is practically model E without the exhaust-heated jacket, designed for motors with hot

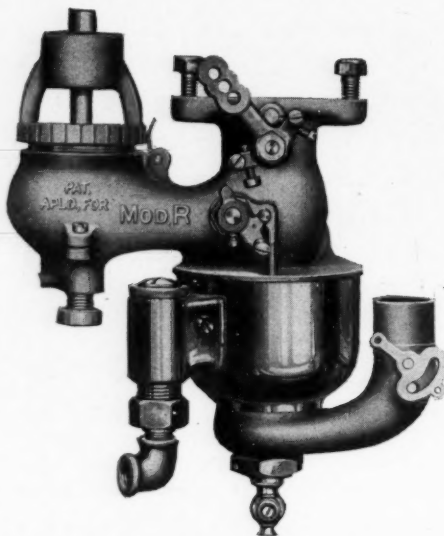


Fig. 17—Schebler model R, which is continued without change

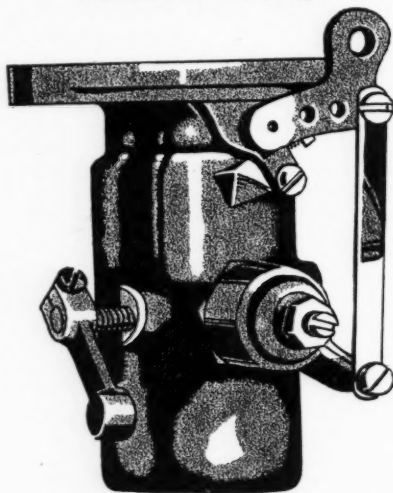


Fig. 18—The compact Tom Thumb instrument, which is of the metering-valve type

intakes. It has a heated-air intake and is designed to handle heavy fuel. Model E, standard, and model N, are continued. These form the main production. They have been improved to take the lower grades of fuel

now on market. The alterations are in the nozzles, jets and air valves, which increase the velocity of the finer mixed fuel.

Fuel flow is regulated by an auxiliary high-speed jet, which is uncovered by an auxiliary butterfly air valve. Fuel is vaporized by a spray nozzle jet in the venturi and by the application of heat. A gasoline well at the bottom of the jet extends up into a venturi passage. The auxiliary nozzle is in the form of a tube extending down into the well.

The float chamber is eccentric, and the gas flows to the well from the chamber through a flat strainer piece. It passes through a needle-valve opening into the jet and then to the venturi. For easy starting a choke shuts off the main air. The auxiliary air remains closed until the suction is sufficient to operate it against a coil spring. Raw gasoline is drawn from the main and secondary jets in starting.

Adjustments can be made by the needle valve at the bottom, which affects the gasoline, and by a screw on the side, which affects the air. This governs the tension on the auxiliary air valve spring. Hot-air attachments are furnished for both the primary and secondary openings.

Shakespeare Carburetor—This is a metering-pin type of carburetor, an automatic valve carrying the metering needle which operates in a venturi. The automatic valve is held down by a weight, lifted by suction. There is a mechanical division of the fuel which is mixed and then remixed with warm air in mixing chamber, which is heated. A priming device is incorporated that functions with the throttle valve closed. This gives the maximum vacuum and manually-controlled delivery of the over-rich mixture when desired. This control operates in combination with the regular choke.

The primary feature of this carburetor is that all motor speeds and ranges are handled by a single nozzle supplying a series of automatic air steps that cut in gradually.

Newcomb—Newcomb carburetors made by the Holtzer-Cabot Co., Boston, belong in the metering-pin class and have not been changed except for the addition of a pulverizing plunger. The reason for this plunger is to more thoroughly mix the gasoline and air and thus to assist in its vaporization. In addition to the main nozzle there is an auxiliary nozzle which leads to a point opposite the throttle to assist in starting. Air entering lifts the pulverizing plunger which in turn lifts the needle out of the nozzle, per-

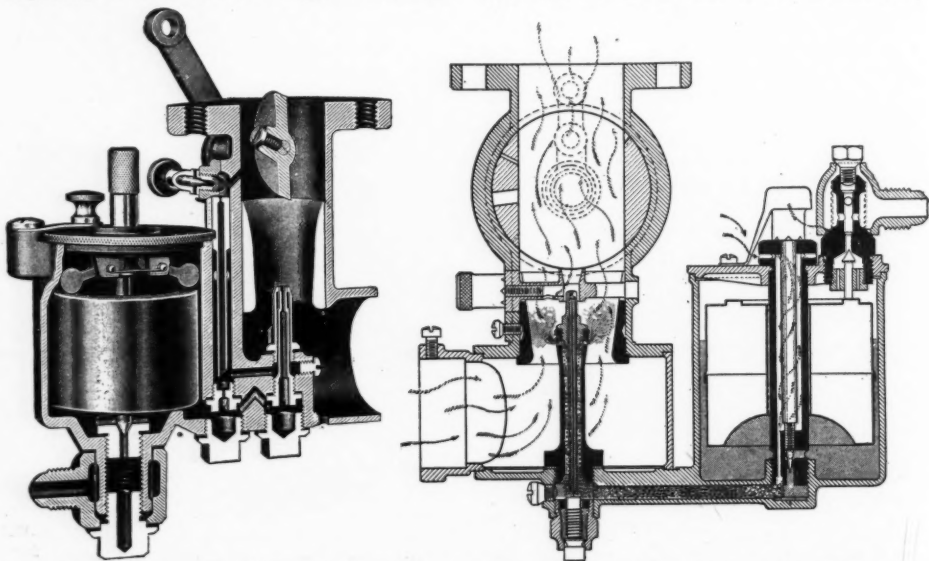


Fig. 19—At the left is a sectional view of the Zenith in which the flow of mixture is controlled by the size of the nozzle opening and the air supply. At the right, a section of the Longuemare, which gives low speed gas through a separate opening

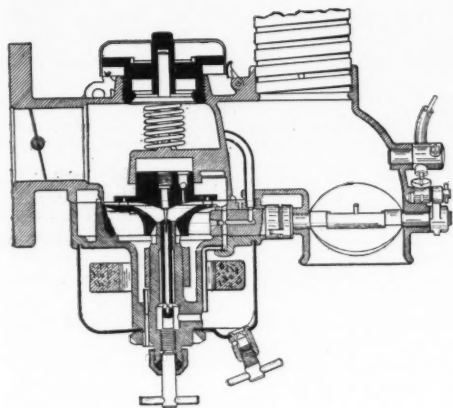


Fig. 20—The Shakespeare metering-pin type illustrating the pin location over the float

mitting a certain quantity of fuel to escape into the chamber.

This passes fuel through a number of small holes at the bottom edge of the plunger, these holes registering with an equal number of narrow air slots in the plunger tube. The air rushing through these slots mixes thoroughly with fuel. The head of the plunger and the upper end of the plunger chamber form a dashpot and this retards the lifting speed of the plunger when the motor is accelerating or the throttle is suddenly opened. This gives a richer mixture during acceleration but when the plunger stops rising the mixture again becomes normal.

On top of the nameplate there is a pointer by means of which the degree of vacuum above the fuel in the float chamber can be adjusted. When turned toward poor the vacuum increases, reducing the flow of fuel and weakening the mixture. This adjustment is uniform over all speeds.

H. & N.—Made by the H. & N. Carburetor Co., New York. In this, movement of the measuring device is controlled by the auxiliary air through an air dash pot. The primary air passes through a venturi, picking up its fuel from the nozzle in passing. For low speeds the fuel nozzle remains unchanged but at higher speeds the opening of the auxiliary air valve raises the metering pin and proportions the gasoline to the air which is flowing through the carburetor.

The duplex is exactly the same but has an additional and separate float chamber and valve for handling kerosene. In addition, there is a heating unit concentric with the venturi and this is heated by the exhaust gases. The motor is started on gasoline and when thoroughly warmed up is switched over to kerosene by a simple, slide valve.

Tom Thumb—The Tom Thumb, made by the National Equipment Co., Chicago, is of the metering valve type in which the opening of the throttle Y, Fig. 32, increases the opening of the fuel port around the needle at X. This is accomplished by a connecting rod which turns the needle lever F on a coarse thread to pull the needle away from the opening. When the engine is at rest the shut-off valve S is pushed to a closed position by the spring R. When the engine is running this valve S is held open by the air valve V. The fuel finds an outlet into the inrushing air through six small holes T through the guide U of the fuel stem. The only adjustments to be made after the carburetor leaves the factory are on the fuel needle and its flow for high speed.

Webber—Webber carburetors, produced by the Webber Mfg. Co., Boston, belong rightfully in the metering, or measuring pin class. Several models are made and they all operate on the same general principle. The nozzle is

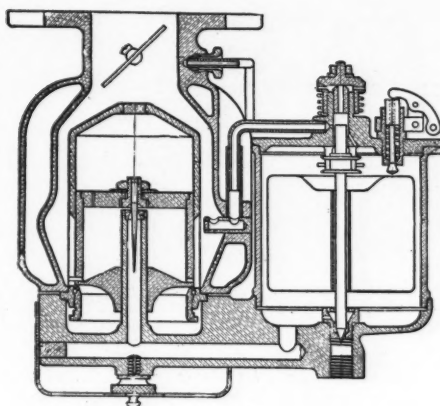


Fig. 21—Sectional view of the Newcomb carburetor, showing the float adjustment

located in a venturi, as usual and the size of the orifice is altered by raising a needle, or pin, out of it through interconnection with the auxiliary air valve.

Thus, at low speeds, when idling, the auxiliary air valve is closed and the gasoline orifice remains at its smallest size. As the throttle is opened, the auxiliary air valve opens and thus raises the metering pin, increasing the supply of gasoline in proportion to the greater quantity of air entering the carburetor. The mixture of air and gasoline, after leaving the nozzle, is caused to pass through a series of smaller venturi tubes which are arranged in a circle around the main venturi and above it. This causes the air and gasoline to be mixed and vaporized.

Multiple Jet Type

Miller—The Miller carburetor, marketed by the Miller Sales Corp., Los Angeles and Chicago, has made an enviable reputation for

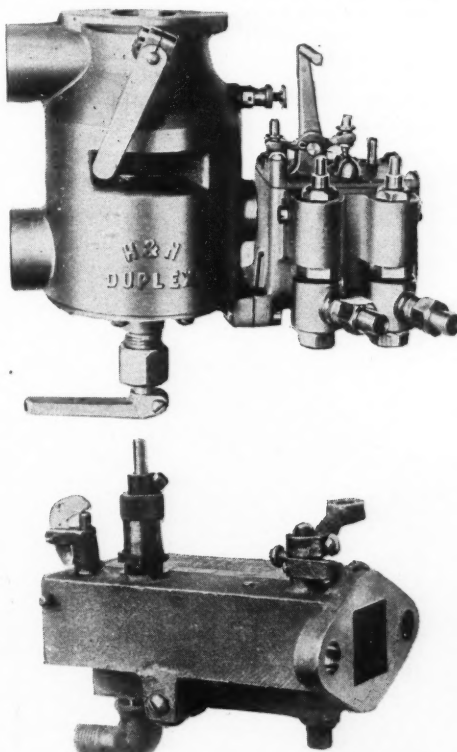


Fig. 22—Above—The H. & N., in which movement of the measuring device is controlled by the auxiliary air through an air dash pot. Below—The extremely simple Sunderman, which operates on the vacuum principle

itself recently in racing. It is of the multiple jet type, and a striking feature is its unusual simplicity. There is no adjustment. Speed changing is taken care of by a series of jet posts, arranged annularly, with a flanged top fitting the throttle chamber and fed from a gasoline well below, the entire unit from the rim to the flange being surrounded by an air chamber.

With a closed throttle, a sleeve which fits within the jet post rests at the bottom of its own travel by gravity. In this position all air openings and all jets but one are closed.

As the throttle is opened, suction from the motor through the manifold causes this sleeve to raise and it uncovers, one by one, the jets. These jets, eleven in all, are placed at graduated heights. As more jets are exposed more air is admitted to the mixture through the opening in the jet posts.

It is only when the motor is traveling at maximum speed that all jets and air spaces will be uncovered. The jet openings created by the raising of the sleeve are, in number, directly proportional to the speed and load of the motor.

The suction sleeve is surrounded by a ring which fits the throttle chamber, and below the ring are jet posts. The opening between the jet posts permits air to enter from the space on the outside. To permit steady rising and falling of the suction sleeve and avoid fluttering, its lower portion is in the form of a plunger weight which fits into a small cylinder. Gasoline is admitted into this cylinder from the well. This small quantity of gasoline below the plunger remains at a fixed level regardless of the throttle demand, which furnishes a positive check on the sleeve.

The efficiency, it is claimed, comes about through the close association of air with the jet openings. Air on all sides must pass close to a jet, and the suction draws gasoline and air from the same points.

The carburetors are made from brass and alloyanum. The float chamber, throttle chamber and jet unit holder being of brass and the multiple jet unit and sleeve being of the latter metal.

Master—Master Carburetor Corp., Detroit, has continued a single model. Its principle of operation is the breaking up of the fuel by a series of jets, which vary in number from 14 to 21, according to the size of the carburetor. These are uncovered by opening the throttle, which is curved—a patented feature—to secure the correct progression of jets. The carburetor has an eccentric float chamber, from which the gasoline is led to the jet piece from which the jets stand up in a row.

The tops of these jets are closed until the throttle is opened far enough to pass them, which it does progressively. The air opening is at the bottom, and the throttle opening is such that a modified venturi is formed. The throttle is carried in a cylindrical barrel with the jets placed below it, and the passage from the barrel to the intake is arranged so that there is no interruption in the flow. For easy starting, a dash-controlled shutter closes off the air, throwing the suction on the jets, thus giving a rich mixture.

The only adjustment is for idling, and once that is fixed it need never be touched. This is in the form of a screw and regulates the position of the throttle when at idling position. The dash control has high-speed, normal and rich-starting positions.

In installing the Master carburetor, the float chamber may be turned either toward the radiator or driver's seat. If the float is turned toward the radiator, however, a forward lug plate should be ordered; otherwise it will be difficult to install the control. The throttle lever must go all the way to the stop lug or maximum power will not be se-

cured. In adjusting the idle screw it is turned in for rich and out for lean.

Carter—Carter Carburetor Co., St. Louis, Mo., is marketing five models. All the Carter carburetors are the automatic multiple-jet type. These are: Model C, hot-water jacketed with low and intermediate adjustments which can be sealed after being set, designed for replacement business, on account of adjustability to varying conditions; model CH, similar but designed for six, eight and twelve-cylinder cars; model F, used for equipment purposes and also for special Ford outfit, without adjustment, except a limited one for the float level; model H, similar except that it has a steel float chamber, and model L, the new one. Model L has all the air received through one intake. It is designed especially for speed and power and easy starting. It is used only for equipment purposes except in the Ford outfit.

In preparation for the 1917 season, the first aim was to produce instruments effective in the use of inferior fuel. The second purpose was to meet the needs of quantity producers of popular priced cars by eliminating moving parts and adjustments and simplifying design.

The problem of deteriorating gasoline was attacked through the combination of three principles. The most important of these is the automatic multiple-jet principle which is the basic feature of all Carter devices. Fuel is supplied to the mixing chamber through a large number of very small jets, thus atomizing it and creating a uniform mixture with the air.

As an aid to this atomizing process the standard method of warming air by the exhaust manifold is used but with this difference. All the air that enters the new Carter instruments is warmed and comes through one opening. It is brought into contact with the various jets by means of venturi tubes permitting the passage of an exceptionally large volume of air to the engine with noteworthy increase in power and passing the jets at a very high rate of speed, thus greatly assisting in the atomizing process. The new model L Carter, which is the last, in combining these principles, is on the market only 30 days.

The instruments are fixed jet types with no

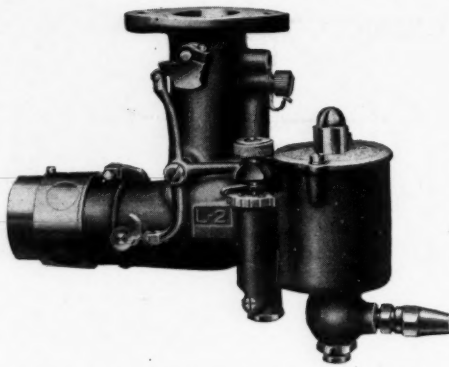


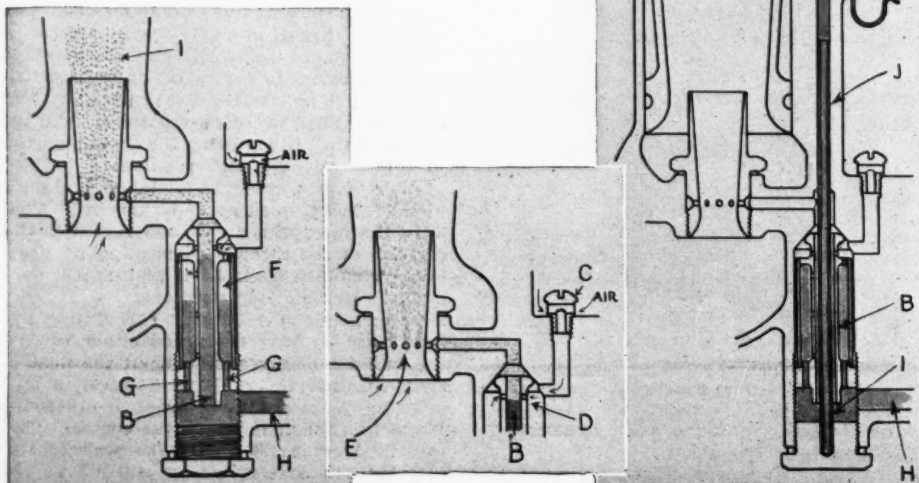
Fig. 23—The Stromberg model L, the plain-tube design, with economizer. The latter is the T-shaped arm, which operates the needle valve automatically with the throttle and air shutter

adjustments, except a limited adjustment for float level. They have no moving parts except the float mechanism. The intake needle at the top of bowl is closed by the pressure of the rising float on a wishbone lever.

The ease with which the Carter starts in cold weather is accomplished by a by-pass arrangement running from the float chamber to a point above the throttle and injecting gasoline into the cylinders automatically by the suction of the engine exactly as though the cylinders were primed through the pet cocks.

Ball & Ball—The Penberthy Injector Co., brought out a two-stage instrument about a year ago but it is standard equipment on Locomobile, Winton and others. The carburetor is really two in one. The primary carburetor is made up of a central jet in a venturi passage. The float chamber is eccentric. In the air passage there is a fixed opening, and additional air is taken in by the opening through suction of a spring-opposed air valve. The second stage, which comes into play as soon as the carburetor is called upon for additional mixture above low medium speeds, is made up of an independent air passage containing another air valve. As the valve is opened this jet is uncovered, and air is led past it.

Fig. 24—Three features of the plain-tube Stromberg. At the right is illustrated the idling jet by which a mixture of gasoline and air is taken in above the throttle at low engine speeds. In the center is the air-bleed jet, showing the air coming in through an auxiliary intake at C and mixing with the fuel passing into the venturi through holes E. At the left is the accelerating well in operation. This is the concentric chamber F, which at low engine speeds is filled with gasoline, which joins the main supply B when throttle is opened



For easy starting an extra passage leads from the float bowl passage to a point above the throttle. All the suction falls upon this passage when the throttle is closed. The passage contains a plunger and acts as a pick-up device. When the vacuum increases the plunger rises and shuts off the flow of gasoline from the intake passage. As the throttle is opened the vacuum in the intake passage is broken, and the plunger falls, causing gasoline to gather above it. This is immediately drawn through the pick-up passage and gives the desired mixture for acceleration.

There are no adjustments. Different sizes of jets can be furnished. There is a hot air choke which the driver can manipulate.

Compensating Jet Type

Stromberg—The Stromberg Carburetor Corp., Chicago, is continuing its model H, which is the mixed air-valve type which has been on the market for some time. The company, however, has just brought it out, and this is the first detailed description of the new plain-tube carburetor under the model names of models L and LB for passenger cars and M and MB for engines having more nearly constant load, such as trucks, marine engines and tractor engines. The suffix B in the LB and MB simply means the horizontal type.

The M is the same as the L in general, except that the L has the added feature of an economizer, which will be explained later.

The term plain-tube carburetor means one in which all the air is taken through a single unobstructed channel of fixed size. The new plain-tube carburetor differs from the conventional type in that: First, air is introduced into the gasoline before it emerges from the jet; second, the jet is a series of holes drilled around the throat of the venturi; third, arrangement is made for supplying a small quantity of rich mixture above the throttle for idling. Gasoline passes from the float-chamber Fig. 25 through the main or high speed outlet A to the passage H and thence through a passage B Fig. 24 around inner tube and through a horizontal passage to the holes in the venturi where it is sucked up by the high velocity air.

The design of this new carburetor incorporates three features intended chiefly to provide easier starting, better idling, and quick acceleration with the present-day grades of gasoline.

These features are:

First, what Stromberg calls the "air-bleed jet," which consists of the introduction of a small and measured amount of air into the gasoline jet just before it sprays out into the main air passage, the air, taking the form of tiny bubbles, breaks up the gasoline discharge and frees it from the retarding action of surface tension so that a free flow is produced with the very low suction which is present at low engine speeds. Incidentally, the introduction of the air, which is dependent upon the suction in the manifold is proportional to the suction and the gasoline flows therefore responds in proportion to the air flow.

How this is done is shown by reference to Fig. 24, in which it will be seen that the gasoline leaving the float-chamber through a regulating orifice A rises through a vertical channel B and air drawn in by suction through the protecting cap C, discharges into the gasoline channel through small holes B and breaking up the gas which issues through a number of jets into the high-velocity air stream of the small venturi E. This construction is designed to give a constant proportion of air to gasoline and also to atomize the fuel.

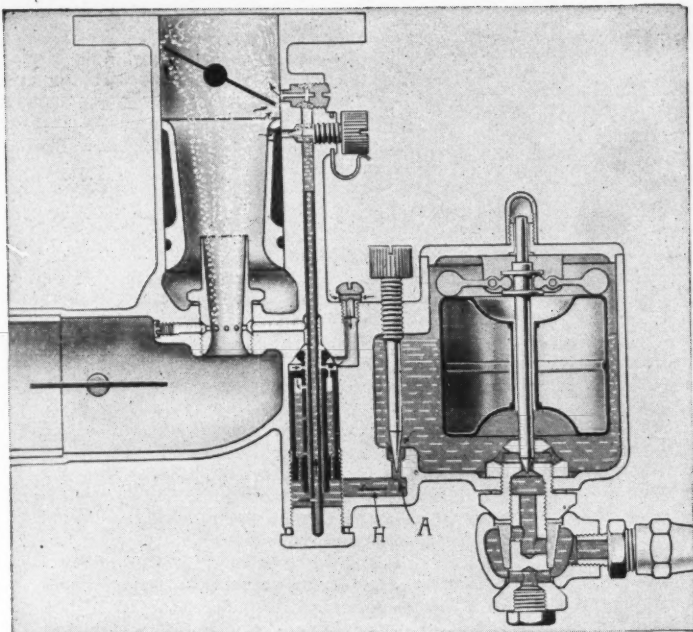


Fig. 25—Action of the Stromberg plain-tube carburetor at 20 miles per hour. A small portion of the fuel is entering through the idling nozzle above the throttle, but the greater portion passes to the annular nozzles in the lower venturi

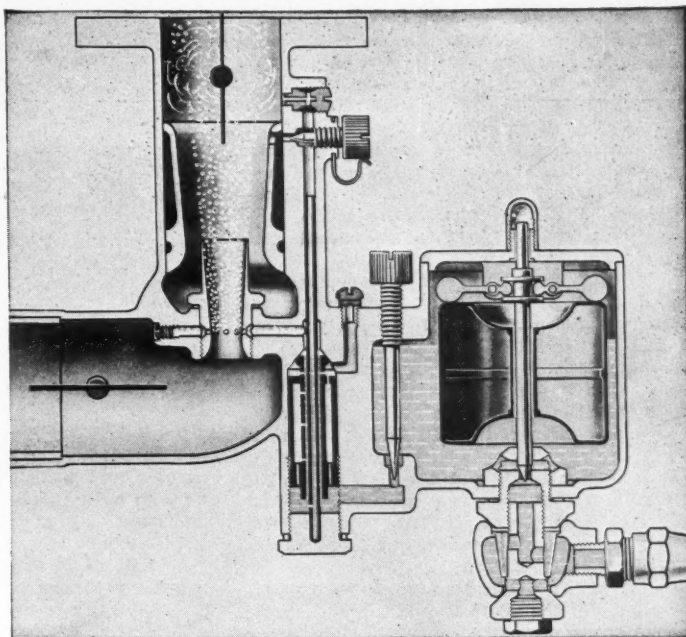


Fig. 26—Action of the Stromberg plain-tube instrument at wide-open throttle. All of the fuel passes through the main jets into the lower venturi, being mixed with a little air from the auxiliary intake and being picked up by the main air. Note the double-venturi construction

The second feature is called the accelerating well. As brought out in other pages, when a carburetor is set to give economical and efficient running at ordinary speeds, it will give a motor that does not accelerate quickly, unless some special means is provided to increase temporarily the proportion of gasoline and air, while adjustments that give a flexible engine are likely to show an increase in gasoline consumption.

In the new Stromberg this temporary enrichment of the mixture is provided by an extra supply of gasoline which normally does not go into the jet but is drawn in upon the demand of a quickly opened throttle. It is illustrated in Fig. 24. Concentric and communicating with the passage B which is the main fuel passage from the measuring orifice to the jet is a reserve chamber F. When the motor is idling, this well fills with gasoline, and whenever the suction in the venturi is increased by opening the throttle or faster engine speed, air is drawn into the well into the space F through the opening C in Fig. 24, and gasoline thus displaced passes through the holes G and joins with the flow from H, more than doubling the normal rate of flow. When the extra demand is relieved, the gasoline in the well again returns to the normal level of the fuel in the float-chamber.

The third feature is the special arrangement for idling, that is, a practically closed throttle with the engine at low speed. In order to provide a good running mixture at practically closed throttle the Stromberg in its plain-tube type has arranged for a small quantity of mixture to flow directly into the manifold above the throttle so that the suction of the engine, slight at low speed, does not have to operate through the large opening of the main venturi to produce the jet, but a small quantity of air is sucked directly from the chamber above the venturi, through a column of gasoline, and out into the intake manifold immediately above the throttle, the gasoline being carried directly to the lip of the throttle, where it would be sucked into the manifold even were it not for the small amount of air which passes through it from below the throttle. This is indicated in Fig. (flow in idle), in which the air is seen to

pass from above the venturi, through an adjustable passage, K, and there mixed with the column of gasoline in the passage, J, and being sucked out into the manifold at L, along with the gasoline. The idling mixture is controlled by the adjusting screw whose point is at K. The gasoline as it emerges into the manifold at L is highly atomized, due to the fact that it discharges into a vacuum of over 8 lbs. existing in the manifold when the motor is idle.

What occurs as the throttle is opened is shown in Fig. 25, which illustrates conditions in the carburetor at a speed of 20 m.p.h. As the throttle is open from idle, more gasoline is drawn from the orifice A and it begins to discharge into the small venturi as well as through the jet at the edge of the throttle.

At high speeds the high air velocity through the venturi is so great that practically no gasoline passes through the idling nozzle.

An added feature applied to the models L and LB is the economizer designed to provide a richer mixture needed for power at wide-open throttle and starting, while permitting

the normal adjustment to remain lean for economy sake at ordinary driving speeds. It is designed to graduate the gasoline adjustment to the highest point of efficiency for each throttle position. This is illustrated in Fig. 23 and consists of a T-shaped part, having at its upper end, a roller resting on a cam which turns with the throttle, and its lower end resting on a second cam operating the main air shutter. The horizontal portion of the T ends in a shoe upon which rests the adjusting nut, controlling the high speed gasoline metering needle. The shape of the cam on the throttle is such that the needle is raised slightly at closed throttle, lowered for ordinary driving positions ranging from 15 to 35 m.p.h., and raised again as the throttle is opened for speeds above this. At the same time, the roller on the lower end automatically operated by the main air shutter, giving more gasoline when the shutter is closed for starting. The low-speed adjustment for ordinary running conditions is the metal arrow on the notch sector below the high-speed adjustment, and by moving this the limit of drop of the high speed needle can be adjusted.

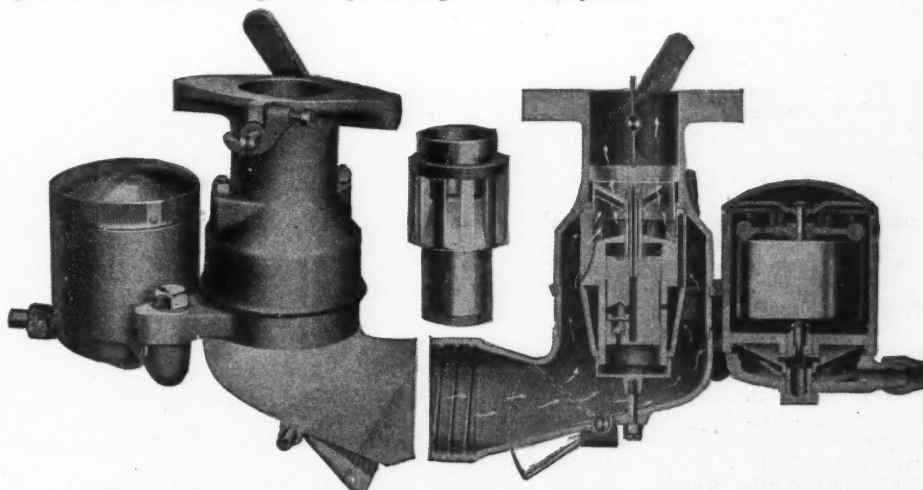


Fig. 27—Exterior and away views of the Miller carburetor. Speed changes are taken care of by a series of jet posts, arranged annularly. An air chamber surrounds the jet posts and the air literally wipes the gas from the jets and into the cylinders of the motor

Zenith—Zenith Carburetor Co., Detroit, is making no new models. The only change is individual butterfly adjustments on the Duplex. The flow of the mixture in the Zenith carburetor is obtained by regulation of the nozzle opening and the air supply. Uniform vacuum is maintained in venturi. The elements depended on to secure vaporization of low grade fuel are finely divided jet spray, high velocity and heat. Low grade fuels sometimes cause higher velocities and more heat.

The carburetor has as a primary the fixed nozzle in the venturi. The secondary jet surrounds the primary and feeds fuel through the same venturi. It draws its supply of gasoline from a well at the bottom of the easy starting tube. At idling speeds this tube is full of gasoline as far as the level in the float chamber, thus feeding a rich mixture. At running speeds the gasoline in the tube is exhausted, and the flow is sucked through the well passage into the secondary jet with a supply of air. An idling adjustment is on a needle valve, but there are no other adjustments on the carburetor. In buying Zenith carburetors the make and year of the motor should be known, as the jets and choke passage must correspond. The intake should be the same diameter inside as the carburetor.

Holley—The Holley Bros. Co., Detroit, makes a new model known as K. It differs from the HA in that it has no moving parts and has an enlarged area that gives increased capacity and better fuel consumption. Models G, Ford type, and HA are continued without change, except for details in the float mechanism that give better fuel control.

Mixture flow is regulated by the vacuum at the jet, the intensity of this being controlled by the amount of throttle opening and by the varying positions of the actual air throat in the choke tube from which it is transferred to the jet by means of a standpipe. This standpipe extends from a well in which the gasoline lies in a small pool available for use. A tube leads from this pool to a point above the throttle, and through it gasoline is sucked at low throttle opening for easy starting. When the throttle is opened wider the gasoline does not have time to fill the well and, hence, a mixture of air and gasoline is taken. The wider the throttle the greater the proportion of air, giving the compensating effect for high speeds. The only adjustment is the needle valve at the bottom, which governs the flow of the gasoline into the well. A dash-controlled choke for cold weather and easy starting acts as a butterfly valve on the main air intake.

The Ford type is the same in principle. It has no standpipe, but the easy starting, or strangler, tube and the compensating well is there. The needle adjustment on the Ford type is from above instead of below.

Sunderman—Sunderman carburetors, produced by the Sunderman Corp., Newburgh, N. Y., belong in the compensating jet class and operate on the vacuum principle. The two nozzles are at right angles to the air flow. They taper at an angle of 45 deg., and the passage of air past them creates a high vacuum directly at the nozzles. This effectually breaks up the fuel into a very fine mist. The mist is broken up and gasified further by passage through a screen.

As the motor starts, the suction raises the air valve, which is held closed merely by gravity. The valve opens just enough to permit the air to sweep over the lower of the two nozzles. As the motor speed increases, thus increasing the suction, the air valve raises higher, thus bringing into play the second nozzle, which is higher. This gravity-closed valve has another advantage in that it acts as an automatic check valve and closes instantly with a backfire through

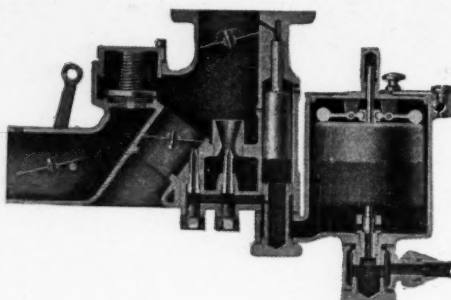


Fig. 28—Cut-away view of the Ball & Ball two-stage instrument which gives a supply from two separate sources, depending on the demands made by the car speed

the carburetor. The outlet from the carburetor is square in section and measures 1 in. on each side. This virtually equals 1½ in. round, and for this reason this one size of instrument is suitable for a wide range of engine sizes. For the larger sizes it is merely necessary to use larger jets. The vacuum principle remains the same regardless of the

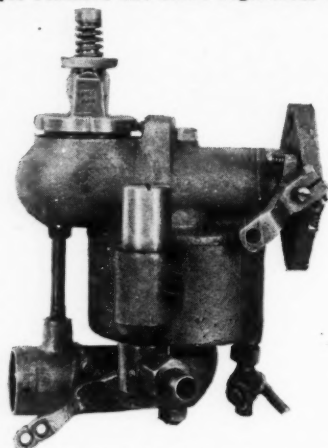


Fig. 29—The Fletcher takes care of the ordinary requirements through a main jet, with an auxiliary jet coming into operation for wider openings

size of the jets. The same applies where six, eight or twelve cylinders are concerned.

Fletcher—The Fletcher carburetor is made by L. V. Fletcher & Co., New York. Ordinary requirements of the motor are taken care of by the main jet, with an auxiliary jet coming into action for wider throttle openings. The peculiarity is that the mouth of the venturi enclosing the main nozzle is carried higher than the auxiliary nozzle. To this feature is ascribed the ability of the device to permit low throttling and good idling.

Air enters through the primary inlet and passes through the venturi, picking up its

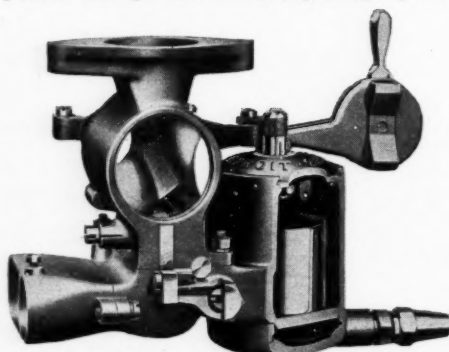


Fig. 30—In the Master carburetor the fuel is broken up in a series of jets which vary in number from fourteen to twenty-one, according to carburetor size

supply of gasoline. As the throttle is opened the auxiliary air valve opens, thus drawing air past the compensating jet. At first it draws nothing but gasoline, but it later draws a mixture of gasoline and air through this jet. Thus, the proportion of fuel and air going through the carburetor outlet remains constant.

Mixed Type Carburetor

Rayfield—The Findelsen & Kropf Mfg. Co., Chicago, manufacturer of the carburetor, is continuing the model G as the chief feature of its production program for 1917. This is not a new model, but there have been some detail refinements, designed to give quicker acceleration and take care of the lower grades of fuel. While the model G is the prominent one of the line, there is a model L, which is the same in every respect, except that it is not water-jacketed as is the horizontal type of the model L. The chief improvement lies in the rearrangement of the metering pin, which is operated by the upper air valve. Previously this pin was held against the air valve by a spring, and the valve had to overcome the reaction of the spring to operate it. Now the metering pin rides on the dashpot piston, which is on the lower end of the air valve stem, and moves upward and downward with the valve but without any greater effort by the valve.

Rayfield uses a metering pin, which is lifted as the throttle opens in the main jet through a linkage, and so establishes a right to be classified as a metering pin type, but it goes further: It incorporates an auxiliary nozzle, which also has a metering pin which is depressed when the auxiliary air valve opens. Thus, by having two distinct nozzles, it establishes its right also to be classified as an expanding type of instrument. But Rayfield goes still further in that it combines a pumping action on the gasoline in the auxiliary nozzle whereby a very rich mixture is furnished for acceleration whenever the air valve is opened suddenly. This is accomplished by the piston on the lower end of the air valve stem, this piston working in a dashpot above the piston and is admitted to the space below the piston by the disk valve in the piston. When the air valve suddenly opens, forcing the piston downward, this disk valve is closed automatically, forcing or pumping the gasoline upward through the fuel passage into the nozzle, where it is sprayed into the inrushing air. Only when the valve opens is this pumping function occurring. At other times the gasoline issues through this auxiliary nozzle according to the suction of the motor. Thus Rayfield is a compound of two metering pins in conjunction with the pumping function for acceleration. The dashpot also prevents any fluttering action of the valve, since the gasoline flow dampens sudden opening or closing.

Kingston—Kingston carburetors, manufactured by Byrne-Kingston & Co., Kokomo, Ind., are produced in a number of different models. The chief one for pleasure car use is the model L, which is applied as stock equipment on a large percentage of the Ford cars and developed with slight changes for application to other cars. In addition, several models are brought out for tractor, marine and stationary service under the general designation of inclosed type. They are designed for operation under conditions in which a great deal of dirt and dust is in the air, the feature being that all the air is taken in at one intake, which may be protected from dirt. The Kingston Duplex is the most interesting model as it is arranged to operate both on kerosene and gasoline and has two float chambers, two nozzles, two mixing chambers, with a three-way valve to the manifold. Thus, it is two distinct car-

bureters, one for gasoline and one for low-grade fuel, having only the connection to the manifold as a common part. This carburetor retains the old Kingston feature of ball valve.

The model L, which is the later design, has a concentric cork float around a jet placed at an angle from the vertical. The air, all of which is heated, is taken in through a single opening and sweeps downward through a curved passage whose shape gives it the proper velocity and direction to sweep across the end of the flat nozzle, thus picking up the fuel. The suction is regulated automatically by means of a flapper valve, which assists in acceleration and whose action is explained below. Referring to Fig. 12, fuel enters the carburetor from the tank at connection A and is maintained by the float F at such a level that there is always a pool of gasoline at the point D in the base of the tube when the motor is not running. This is for positive starting. When the motor starts this pool is quickly lowered to a lower portion of the tube, depending on the adjustment of the needle valve, and it continues to feed from this point until the motor is stopped. The arrows show the direction of the air and how it passes over the point D picking up the fuel.

When the motor is running slowly the air valve B rests lightly on its seat, allowing no air to pass, consequently all air must pass through the low speed tube C, as the lower end of this tube is close to the spray nozzle and all the air at low speed has to pass this point. The atomized gasoline drawn from the nozzle B becomes thoroughly mixed with the air in its upward course.

As the throttle is opened the air valve B rises slowly, permitting a small volume of mixture to pass by, due to the suction of the engine. At this point a change in operation occurs. The low speed tube C still continues to deliver a perfect mixture but is being assisted by the air valve opening. The air must pass across the spray nozzle D between it and the low speed tube C. As the motor speed is increased to its maximum the air valve continues to rise higher, permitting more and more air to pass across the spray nozzle with no increase in velocity and picking up the gasoline from it. Enriching the mixture for starting and warming is accomplished by a dash needle valve adjustment, which operates on the valve H, and also by a dash control of the choke valve E in the air passage.

Tillotson—The Tillotson Mfg. Co., Toledo, Ohio, makes three models altogether, which are known as B, C and D. Model D is the same as B, except it is for vertical instead of horizontal flange. This is a double jet, variable venturi carburetor. A partially uniform vacuum is maintained at the fuel nozzle by two flexible reeds mounted on a cage designed so that the maximum opening takes care of the volume required to fill the combustion chamber at maximum piston speed.

When the reeds are seated they provide the highest possible vacuum at slower engine speeds. They are placed so that as they move they form a virtually variable venturi. A secondary nozzle comes into operation at higher engine speeds and is not in use at the lower speeds.

The body design of the carburetor permits only one air intake, and thus it is quite simple to pre-heat the entire air supply. The particular feature is that the heavier fuel is taken care of by the pre-heated air and that the velocities through the variable venturi are as high as possible.

Models B and C are used by the Willys-Overland, which takes about the entire output of the company.

Johnson—The Johnson Carburetor Co., Detroit, makes a concentric float type with adjustable main jet. The fuel is governed by

an automatic sleeve air-valve in a cylindrical mixing chamber. The cylindrical sleeve is concentric and carries a small plate at the bottom, which regulates the jet passages and governs the mixture. The adjustments consist of a screw at the top to regulate the idling mixture and one at the bottom, the main jet opening. A dash choke rotates a strangling tube, shutting off all air.

The suction of the engine raises the sleeve and allows it to float automatically, governing the jet size by engine requirements. There are no new models this year and no changes.

Shain—The Shain carburetor, made by C. D. Shain, Brooklyn, N. Y., is a combination of weighted air valve and single jet types. The jet is normally closed by a bronze ball, which is raised off its seat by the rush of air, thus permitting a certain

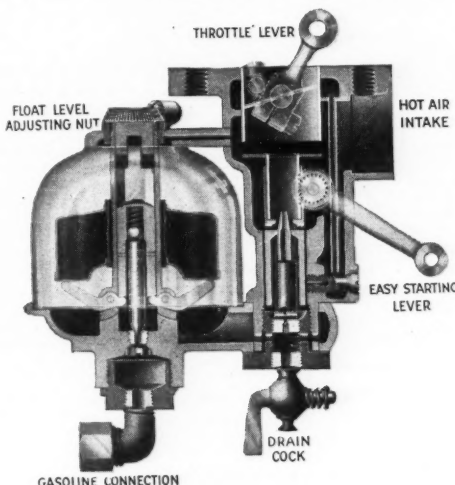


Fig. 31—There is but one adjustment in this Carter instrument which is in the form of a knurled screw which regulates the height of the float

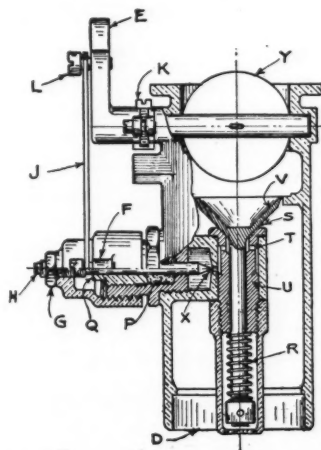


Fig. 32—Section through the Tom Thumb which has two adjustments, one on the fuel needle and one regulating the flow for high speed

quantity of fuel to mix with the air. There is no float, the ball over the jet preventing leakage of fuel when the motor is stopped.

In operation the rush of air causes the ball to rotate and thus to throw out a thin mist of gasoline which is mixed with the air, which also is rotating, and thus passes on to the cylinders.

The carburetor has no adjustments, the proper size to use being determined by the inside diameter of the intake manifold. The air passes through a series of baffle plates before passing the ball, and the holes in these are proportioned to the outlet diameter

of the carburetor. Several of these holes are threaded to receive plugs, so that an adjustment here is possible. Once made, however, it is never changed. It is also possible to vary the size of the jet.

Kerosene Carbureters

Kerosene—The present type of American carburetors, the product of the Kerosene Carburetor Co., Frankfort, Ind., is known as the model K. It is designed to handle low-grade fuels and kerosene in particular and has three fuel chambers, one for kerosene, one for gasoline and one for water. They are alike and communicate with the air passage of the carburetor.

The fuel lines lie in the same plane and are intercepted by a close-fitting valve rod containing three port holes, two of which are in the same plane with the kerosene and water lines. The other port is at right angles with these two. When the lever communicating with the valve rod is moved one-quarter turn back, the gasoline port closes and the kerosene and water ports open. Thus the motor receives the water with the kerosene.

Kerosene-Burning Carburetor—This double-float arrangement for starting on gasoline and running on kerosene or heavier fuel makes use of the customary float chamber, eccentric with fuel admitted to a long jet controlled by a needle valve. The jet is at the center of a venturi. Air is admitted around the jet through the venturi, and when the speed increases a ring which is drawn up by suction, uncovering three holes on a level with the jet. These increase the air supply at wider throttle openings and tend to maintain a constant vacuum.

A flat valve in the air passageway is raised by increased air pressure. It is attached to a linkage which operates an air valve above the mixing chamber. The admission of air at this point acts as a compensating medium.

After the fuel is mixed it is passed through a vaporizer which preheats the mixed charge by the exhaust. When the mixture enters the cylinders it has been mixed and preheated in the vaporizer. An automatic device throws the carburetor over to gasoline when the throttle is closed, so that the last few strokes of the engine are made with gasoline.

Western Kerosene-Gasoline Carburetor—The carburetor made by the Western Motor Appliance Co., Charles City, Iowa, is designed to handle either gasoline or kerosene or intermediate fuels. It has two float chambers, one for gasoline and one for kerosene, and nozzles discharge into a double-venturi chamber. Additional air is taken in around the inner venturi. When the motor is warm the gasoline is not needed, but in starting a cold motor a simple push-and-pull dash control serves to switch from one fuel to another. A special Ford outfit with manifold is available. The upper venturi can be adjusted by the operator. The carburetor is furnished with three fuel nozzles, fixed in size and position. Adjustment is made by air control.

Trotter—The Trotter Kerosene Carburetor Co., Des Moines, Iowa, is an auxiliary carburetor designed to be used with gasoline carburetors to enable them to handle kerosene and other low-grade fuels satisfactorily. Consequently, it is not a carburetor in the true sense of the word. The device receives the oil after it passes through the conventional carburetor and vaporizes it by heat. Special outfits are designed for Fords.

Adjustments on Next Page

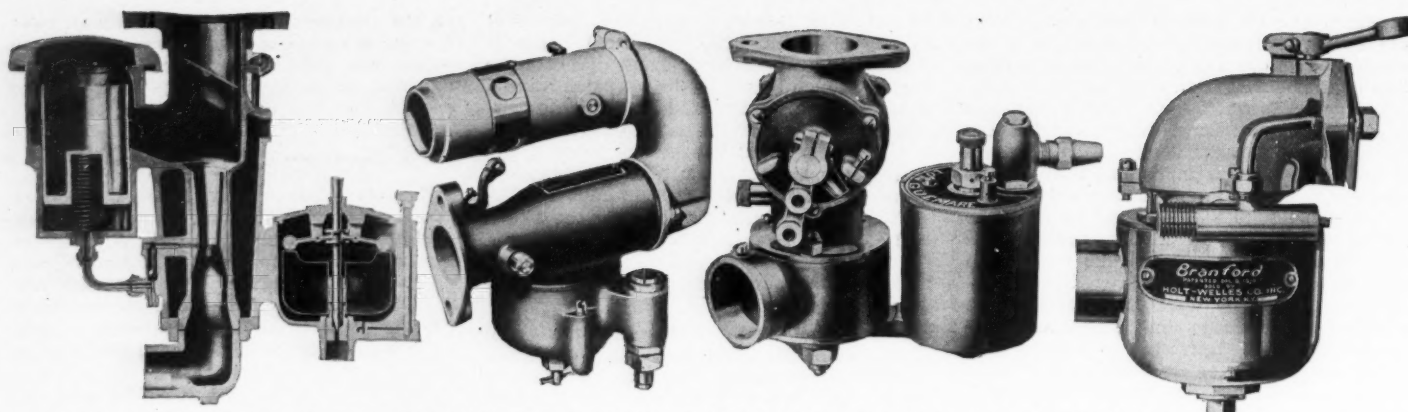


Fig. 33—The Browne, Tillotson, Longumare and Branford carbureters respectively. Note the float arrangement of the Browne instrument. A unique hot air piping is shown in the Tillotson

Look to the Carbureter Last

Keep the Instrument and Attachments Clean—Do Not Tinker

By Wallace B. Blood

IF a motor balks, if it stalls on the road or begins to spit and fire back the inexperienced driver says, "carbureter trouble." There is probably no instrument on the car so much tampered with with as little need. A modern carbureter needs clean fuel and plenty of it at all times and possibly needs a little compensatory adjustment for atmospheric changes, but as far as its suddenly dropping out of adjustment is concerned it is as rare as a hotten-tot in Alaska.

Before a carbureter adjustment is tampered with, the symptoms should be looked for first. We are buying very poor gasoline these days. Where methods of storage are lax there is a chance for dirt and water to work in. With the modern roadside filling stations where the garageman often throws the hose nozzle into the dirt to collect his \$1 for 5 gal., the next man gets the grit washed off the dirty nozzle into his tank. Needle valves, jets and other atomizing appurtenances in a carbureter permit a passage for the fuel which is measured in thousandths of an inch and there are few grains of sand and dirt which can pass through, although there are a surprising number of them that seem to just make a wedge fit in the passage. So, first of all see that the float chamber is free from water and that the gasoline line and carbureter itself are not stopped up at some point with grit.

In the following paragraphs will be given the carbureters possible part in symptoms of derangement in the operation of a gasoline motor. Remember, this is the carbureter's part and the ignition should be looked to first.

Difficult Starting

No gasoline in the carbureter naturally means no explosion. The needle may be raised or the float struck. The throttle may be too wide open with a cold motor or

too much closed with a warm motor. In a cold motor the mixture may be too thin to fire. Use the choke. The carbureter may be flooded. In this case drain the float chamber from the pet cock.

Motor Will Not Idle

The motor is not sufficiently warm. Race the engine slightly and feed it with a rich mixture until it is properly heated. If, after the motor is warm, the motor refuses to idle properly the mixture is too lean and the slow speed adjustment should be altered.

When Motor Will Not Idle

If, in cold weather, the motor turns regularly at slow speed for a few minutes and then stops without apparent cause, there may be hoar frost near the throttle choking the small passage through which the gas must pass for idling. To remedy this speed the motor up until warm and the frost will be thawed out by the warm air. If the motor, when warm, slows down in jerky fashion the cause is too rich a mixture and the low speed adjustment

should be turned in. If the motor decelerates irregularly, speeding up and slowing down fitfully and then stops when the throttle is closed, the trouble may be an air leak in the manifold. In this case the joints of the intake should be re-gasketed. The same symptom can come from improperly set valves.

When the Motor Overheats

An overheated motor may be caused from an overrich mixture, although the radiator system, the setting of the ignition and the cleanliness of the motor as regards carbon should be looked to first. The high speed gas adjustment or needle valve should be turned down for less gas, or in case of hot summer weather, the stove-connection adjustment should be opened providing there be one, or if not the hot-air pipe should be removed altogether.

When the Carbureter Floods

If, when one attempts to start the motor it is observed that the gasoline leaks from the bottom of the carbureter remove the needle and its point and the seat in which the point locates should be examined for dirt. If the carbureter is

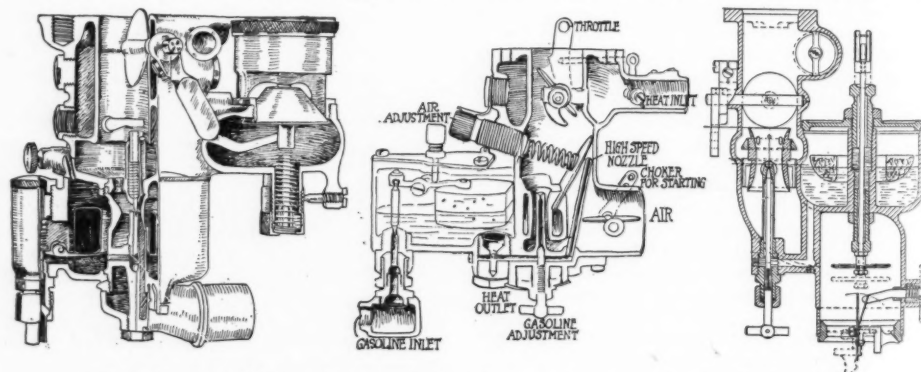


Fig. 34—The Webber, Marvel and the Kerosene Burning. In the Webber instrument the air-valve adjustment is locked with a pin which turns into the threads of the screw. The Marvel instrument has a needle-valve adjustment in the bottom and an air-valve setting. The Kerosene burning instrument embodies a double-float arrangement, as is becoming common practice in carbureters of this kind

vigorously flushed out several times, the dirt may possibly be removed without need of removing the needle. New copper pipes oxidize until they are "seasoned" and give off scale. This often clogs the pipe or carburetor itself.

Another cause of flooding may be that the float, providing it be a metal one, has been punctured, or providing it be a cork one, has become "water logged." With the metal float the puncture should be soldered, care being taken that the solder is dressed down as closely as possible so that there will be the minimum added weight. With a cork float the gasoline should be slowly baked out and a new coating of high-grade shellac applied.

Insufficient Maximum Speed

If the car does not attain the speed it should the mixture may be too lean, or it may be too rich. The remedy is to cut and try with the high-speed adjustment until the desired results are attained. Defective pipes or insufficient hot-air supply also have their effects in speed reduction.

Adjustments

Stewart Models 25 and D-5 Six

The Stewart has but one adjustment, which consists of a device for lowering or raising the metering pin, thereby increasing or decreasing the amount of gasoline admitted to the mixing chamber. This adjustment should be made with the motor running at slow speed and the clutch disengaged, assuring yourself first that the motor is operating at normal temperature. The adjusting screw, which is located directly above the throttle control lever—the screw set at an angle—should be turned slowly up or down until the motor runs smoothly.

Master

The Master has no adjustment other than the Master controller, which is fitted to the steering column. This is in the form of a lever with three designated positions on a dial. As the function of each position is printed on the dial, it is quite unnecessary to describe the adjustment. Enough to say that the rich starting setting should always be used when the motor is cold and the lever should be gradually moved back toward "normal running" as the motor warms up. It is well to remember that the most economical operation is at the setting nearest the

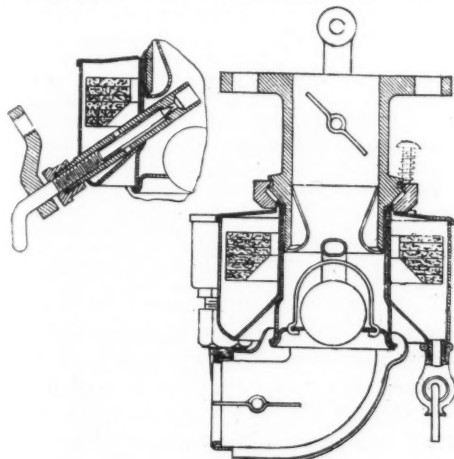


Fig. 36—Section of the K-D carburetor showing unusual simplicity. The needle arrangement is shown in the section in the upper left corner

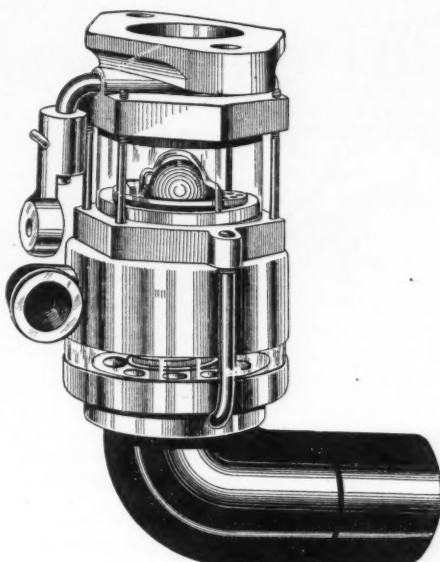


Fig. 35—Shain carburetor. The jet is normally closed by a brass ball, which is raised off its seat by manifold suction when the motor is speeded up

"rare high speed" mark on the dial that the motor will run without missing.

Marvel

The gasoline needle valve located on the bottom of the Marvel carburetor should receive first attention when an adjustment is necessary.

1—After closing the valve by gently turning to the right until seated, open to the left three-quarters of a turn.

2—The air-adjusting screw, which is the slanting screw on the side of the carburetor, should be so adjusted that the end of the screw is about even with the end of the ratchet-set spring.

3—With the motor thoroughly warm, the throttle should be closed so that the engine is very nearly idle. Close the needle valve very gradually until the motor runs smoothly.

4—Turn the air valve to the left about one-eighth of a turn at a time until the motor begins to slow down. Then turn the valve in the opposite direction, very slowly, until the motor runs smoothly again.

5—Advance the spark two-thirds of its normal travel. Open the throttle quickly as far as it will go. If the motor pops back the needle valve should be turned to give a little more gas., and it may also be necessary to tighten the air valve a bit more.

Zenith

The choke tube or venturi, the gasoline jets and secondary well, chosen correctly in the start as regards size control to a great extent the adjustments of the Zenith. A choke tube too large will cause irregularities when running full open and when slowing down.

The throttle adjusting screw will regulate the opening of the throttle for low speed and the position of the regulating screw on the side of the priming tube will regulate the quality of the mixture at that speed; in screwing it in the mixture will become richer and in unscrewing it the mixture will become leaner. The composition of the mixture at normal operating speeds is fixed and cannot be altered with replacing the jets.

K-D

In adjusting the K-D:

1—Set the dash adjuster which controls the needle valve to lean.

2—Close the needle valve and open about $\frac{1}{4}$ of a turn.

3—Start motor and by turning needle valve cause the motor to idle properly.

4—Open the throttle suddenly and if acceleration is weak or the motor backfires, open the needle valve until this ceases.

Schebler Model T

This is a carburetor with but one main adjustment controlling the needle valve for low speeds. After this adjustment is made the carburetor is automatic in action. The instrument requires a steering column or dash board control which turns the lever on the carburetor to enrich the mixture for cold weather starting. It also serves to open a priming jet between the carburetor throttle and the motor. This dash or steering column control should be placed in the air or lean position when one desires to adjust the carburetor. By referring to Fig. 14, the air-valve should be vertical with the air-brake pipe.

1—Turn adjusting screw on top four or five times to the right.

2—Run the motor until it is fairly warmed up, pulling up the dash control if necessary, and letting it down again when the motor is properly heated. Open the throttle to speed the motor up a small amount.

3—Turn adjusting screw C to the left or toward lean as it is indicated on the dial moving screw, notch by notch, until the motor fires evenly.

4—Retard the throttle and spark and adjust the idling speed to the desired amount with the idle screw. Turning this clockwise increases the motor speed and turning it counter-clockwise decreases the motor speed.

Kingston

There is but one adjustment in the Kingston carburetor which controls the needle valve for more or less gasoline. As shown in Fig. 12, the needle valve H is controlled by the slanting screw. To adjust the carburetor do as follows:

1—Heat the motor thoroughly by partially closing the air-valve E so that a rich mixture will pass into the cylinder.

2—When the motor is started the needle valve should be screwed out of its seat or counter-clockwise about one revolution.

3—Turn the idling adjustment down very slowly until the motor runs smoothly. The throttle should be very slightly and the spark fully retarded.

Stromberg, Types L and M

In this newest Stromberg instrument, the gasoline is automatically measured by the action of the air-flow for all speeds and loads. There are three adjustments, one which controls the gasoline supply from the float chamber and regulates the mixture through the

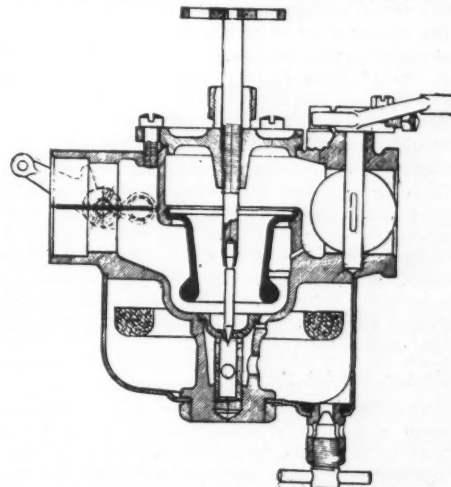


Fig. 37—Section through Holley carburetor with needle-valve adjustment on the top

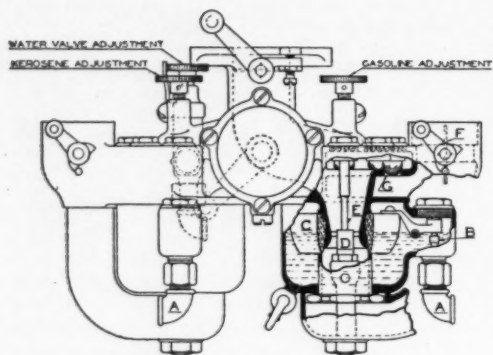


Fig. 38—The Kingston duplex, which is a kerosene-burning instrument. An adjustment is provided to regulate the supply of hot water lead to the jacket of the instrument

entire speed range, and idling adjustment and an economized adjustment. After the motor has been thoroughly warmed with the narrow jet screw raised so that the exhaust burns black showing too much gasoline, about 24 notches from its seat, turn this nut down slowly until the motor begins to miss, then turn it up very gradually until there is an even firing. This regulation should be tested at various motor speeds and if missing is found at any speed, a slight turn made one way or the other to eliminate.

2—The gasoline for idling comes from an entirely different source than that for regular running. The regulation is made on the vertical side screw which should be somewhere between one-half and one and one-half turns counter-clockwise of the seating position. After the motor is thoroughly warmed up, this may be regulated by turning one way or the other, to give the desired setting. Turning to the right gives more gas and to the left less gas. It must be noted that this adjustment has effect only when the throttle is very nearly closed.

3—When one opens the throttle, he will observe that at speeds up to 10 miles an hour and above 35 miles an hour approximately, the nut and needle on the side are stationary, but at speeds between these two figures, the assembly drops down. This automatic action is to give a richer mixture than is required for full throttle, designed for economical operation of the carbureter. The amount of drop depends upon the amount of clearance, which is regulated by the curved pointer lever.

4—To make the adjustment described in No. 3, the spark should be fully retarded and the throttle opened to a position which turns the motor over at a speed corresponding to about 20 miles per hour. The pointing lever L should then be set one notch less than the finished mixture on which the motor will run steadily. Under ordinary conditions this would be the third or fourth notch.

5—For cold weather starting there is a dash or steering post control which should be pulled up all the way for an instant and gradually set down until the motor is thoroughly warm when it should be completely open.

6—The type M Stromberg carbureter differs from the type L only in that it lacks the economizer adjustment.

Carter, Model F

The Carter carbureter has for an adjustment a float level adjusting nut only. This float lever adjusting nut is so marked in the illustration. For winter driving if the weather is continued moderately cold, turn the nut to the left or counter-clockwise and if the weather is warm, turn it to the right, each setting being made as far as the nut

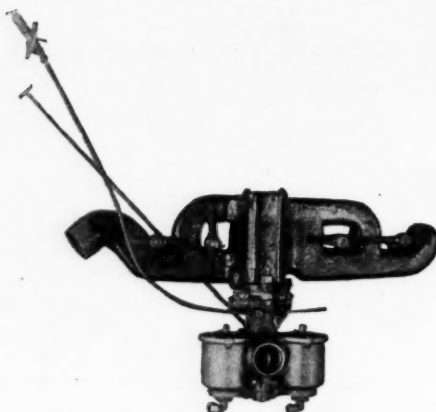


Fig. 39—The Western kerosene-gasoline carbureter embodies two float chambers, one for kerosene and one for gasoline as shown

will go. The easy starting lever should be set as follows:

Attach the rod which connects it to the dash in such a manner that the lever is as far as it will go away from the carbureter when the dash control lever is at the extreme left of the quadrant. Then move the dash control lever about a quarter of this total travel on the quadrant to the right or downwards, providing a steering post control lever is used. This is the running position at normal temperature.

In extremely high temperature, the dash control, or post control should be moved to carry the lever away from the carbureter to a point where the motor gives the best results. When the temperature is extremely low the opposite applies; that is, the easy starting lever should be moved toward the carbureter. For cold weather starting, the motor should be moved toward the carbureter its full length and then gradually upwards until the cylinders are heated.

Rayfield Models G and G-P

The new Rayfield models are identical in adjustment with their predecessors, there being but two adjustments, one for high speed and one for low. With this as with all others, the motors should first be warmed up to its most efficient operating temperature.

1—With the spark and throttle fully retarded turn the screw B shown in Fig. — to the right or left until the proper idling speed has been attained. Turning to the right, or clockwise, gives more gas, to the left, or counterclockwise, less gas. As a primary setting with a carbureter which is entirely out of adjustment, this should be turned out about one complete revolution.

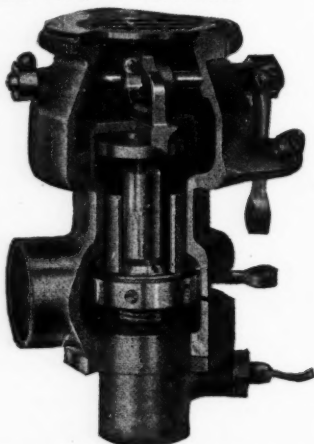


Fig. 41—Sectional view of the Heath instrument showing the cam arrangement for operating the throttle

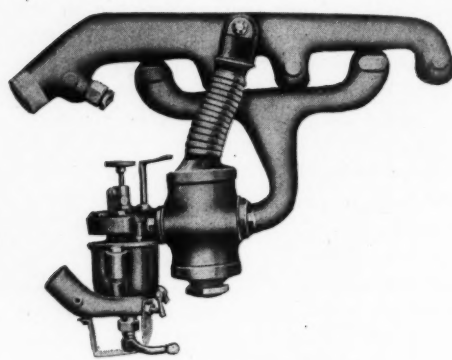


Fig. 40—The Trotter kerosene carbureter for use on Fords. This is an auxiliary instrument designed for use in conjunction with the regular carbureter

2—Advance the throttle to a setting which will turn the motor over at about 20 m.p.h. speed. Turn screw A to the left or counter-clockwise, very slowly until the motor fires evenly. To get the most economical mixture turn down the screw until the motor starts to miss because of the leanness of the mixture and then turn it very slowly to the right until all cylinders fire evenly.

3—The car should then be tried out on the road, and if the motor fails to fire under load the mixture is slightly weak and the high-speed screw should be given a very slight turn to the right.

Tillotson

There is but one adjustment necessary in the Tillotson instrument—the low speed adjustment or needle valve. The air supply is controlled by automatic valves.

1—To regulate the carbureter first run the motor until it is warmed up.

2—Retard the spark and set the throttle so that the motor is running at a car speed approximating 15 m. p. h.

3—Turn the needle valve to the left or right until the best results are attained. When this adjustment is made the valve should be from one to one and one-half turns off its seat. For the most economical adjustment the valve should be gradually turned into the carbureter until the motor starts to miss and then slowly turned out again until firing becomes perfect.

Holley Model H

The needle valve is the only adjustable feature of the Holley model H. This valve is located directly on the bottom of the carbureter.

1—With the spark retarded and throttle opened to a speed which will cause the motor to turn over at a rate which will approximate 20 m. p. h. car speed turn the needle valve to the left until the motor fires evenly. The valve should be opened about one turn from its seat before this adjustment is made.

2—The most economical adjustment is the leanest one. This is where the motor fires evenly with the needle valve at the nearest point to its seat.

TEXAS TO HAVE SPECIAL

Dallas, Texas, Dec. 9—Texas motor car dealers are going to the New York show on a special all-steel train, run under the auspices of the Dallas chamber of commerce, the manufacturers association and the Dallas Automobile and Accessory Dealers Association. The train will leave Dallas Jan. 5 and arrive in New York Jan. 7. It will be a special train and will go as the "All-Texas Special to the New York Motor Show."

Germany Now Using 160,000 Cars

Market for American Product After War Promises to Be Good

By Edward Allen Langdon

BERLIN, Germany, already is making extensive preparations for peace. This holds good for every department of national life, but it is the motor car industry that is of most interest to American makers and exporters of cars. The secrecy which surrounds all data of direct or indirect military importance makes it impossible to obtain official figures as to the number of motor cars in Germany at present, but approximation has it that the empire now uses 160,000 motor cars.

One-half of these cars are on the western front, one-fifth along the eastern front between Riga and Lemberg, and the remainder, along the Rumanian and Saloniki front. In addition, the government has about 50,000 vehicles for carrying officials and industrial products within the empire, and perhaps the same number is in private service. While there are between 250,000 and 300,000 motor vehicles in Germany just now, the number does not grow, because those on hand are sufficient for German requirements and the raw materials are needed more urgently for munitions. The number will not be considered sufficient when the war is over, however, and for this reason it is safe to predict that after the war two-thirds of the motor cars will be replaced by new ones on the following plan:

New Cars After War

The government will keep the cars commandeered during the war, to be rebuilt and used, either for public works or to be sold practically at cost to small farmers or concerns to facilitate farming. The old owners of the cars will receive a government subsidy of from 45 to 65 per cent toward the purchase of new motor cars built in Germany along standard lines and approved in their specifications by the imperial government. Thus, Germany will have a sure demand for about 200,000 cars after the war.

If the war ends within a year, Germany will have a population of 60,000,000 people when peace is made. The empire will then be a highly industrial country and will require ample facilities for transporting passengers and merchandise. If the demand is one machine to every sixty of the population, the market will call for a million motor cars, of which Germany will be able to supply, with international conditions restored to normal, from 50 to 70 per cent. A market for from 300,000 to 500,000 cars of simple, strong construction, efficient in operation and moderately priced, would remain, and it could be supplied by American exporters.

It is now almost certain that Germany will buy abroad and perhaps also from im-

porters in the empire, as one corporation, with the double advantage of eliminating competition among bidders and also of enormously reducing overhead expenses. This does not mean, however, that trading with Germany will not be profitable; only, it will be necessary for American business men to meet efficiency with efficiency. In other words, if Germany's motor car industry and the users of cars in Germany will face the world market as a solid financial unit, Americans will have to adopt the same policy, at least in dealing with Germany.

Taxation and duty will be high in Germany after the war, and only very efficient management will be able successfully to combat these handicaps. Duty on chassis and cars will most likely be higher than on motor car parts, and here the opportunity for the parts manufacturer begins. Motors, axles, steering and transmission gears, which America can supply easily and which would come up to Germany's demand both in regard to quality and quantity, should find a ready and highly profitable market in the German empire.

The same holds true of certain classes of equipment, especially electric starting and lighting sets. There is less opportunity for makers of speedometers and particularly delicate instruments, as the class of labor required for such manufactures is so cheap in Germany.

Even if the market for American cars should be made more difficult after such an introductory period, many users would stick thereafter to the American product if it gave them satisfaction. This point of getting a foothold in Germany immediately after the war is the more important as interests across the channel will hardly be sentimental enough to sidestep profitable business with Germany and as the very machine tools now making munitions for use against the empire will be used then for making other, and marketable, products.

Before the war Germany was England's best customer; after the war, if she can do so without serious loss, she will prefer to buy from others than her former enemies wherever possible without declaring any distinct trade war.

This immediately brings to light another point, which is only of indirect bearing on the motor car situation, namely, that subsidies for cars built along lines approved by Germany will be continued vigorously. This indicates nothing more or less than the preparation for the renewal of the con-

flict now going on. As a matter of fact, well-informed Germans even today admit that, while they are confident as to the result of the war, they do not expect it to bring a definite decision; but they do expect that when the struggle is renewed they will have more friends among the nations than before the present war. From this viewpoint Germany will very likely be ready to make greater advances in its trade relations to America than in the past, and this will be true especially where products of military value, such as motor cars, are concerned.

Another point to be remembered in dealing with Germany is that unless the war continues to the utter exhaustion of Europe, its end will find Germany dominant in the near East, directing the affairs, in a large sense, of not only Austria-Hungary and Bulgaria, but of Turkey, the Balkans and very likely Italy, with a strong influence in Scandinavia thrown in. Therefore the relations of any power with Germany will weigh materially in determining its dealings with the countries belonging to the German sphere of influence, which sphere during the last 18 months has been increased constantly.

Formerly Imported Materials Available

Several materials formerly imported into Germany are not available now, due to the blockade. For most, if not all, of these serviceable substitutes have been found, and the Germans are as a matter of course very enthusiastic over all these discoveries. There is no doubt, however, that a great many of these substitutes, though they are fine makeshifts, will not prove commercial when peace returns; though it may be that with some additional experimenting and study they will develop into profitable propositions.

The most important of these products, so far as the motor car industry is concerned, is rubber. The Germans claim that they are using synthetic rubber now, and as motor cars are equipped with the necessary tires it would seem their statement is correct. It is not certain, however, that the production of the synthetic product can be continued after the war, in competition with natural rubber; and here, too, there may be a field for American manufacturers. The competition in the normal European market, so far as tires are concerned, includes a considerable supply of English- and French-made goods; for which reason the remarks referring to the need of American realization of the early trade opportunities offered by Germany after the war hold true in the tire field also.

New Mode of Testing Engines Devised

Prof. Roesch, of Armour Institute, Shows How
More Information May Be Gained

CHICAGO, Dec. 9—A method of testing motor car engines and of charting the results of these tests in such a manner that a great deal more information becomes available than has been possible in present methods of testing has been developed by Prof. Daniel Roesch, associate professor of gas engineering Armour Institute of Technology. It is Prof. Roesch's contention that the present method shows the performance only under wide-open throttle conditions, a condition not often maintained in use, and that one engine showing superior merits to another under the usual test conditions might not be so good when tested under properly open throttle conditions, at which most motor car engines are usually operated.

His method involves, of course, tests made in the conventional way at various speeds with wide open throttle, and corresponding one at other throttle positions, thus giving power, gasoline consumption, heat losses, effect of spark advance, etc., under all conditions common to driving. Prof. Roesch explained methods of conducting tests and outlined the results obtained and what was to be deduced from them in his paper presented at the quarterly meeting of the Mid-West section last night. This meeting was held at the Armour Institute of Technology, Chicago, and after the presentation of the paper and its discussion, the speaker conducted the seventy-five engineers and motorists present to the testing laboratory of the institution and actually ran a partial test, according to his new method, on a twelve-cylinder Packard engine.

Fewer Gear Changes Expensive

In the discussion G. A. Smith, of the Nash Motors Co., brought out the fact that the results of Roesch's tests showed the great advantage from economy standpoint of operating the engine at a certain definite speed and that it was one of the reasons for the better economy of European engines that more gear changing was done and provided for by European manufacturers; that American disinclination to change gears cost them a great deal in fuel.

Engineer Mock, of the Stromberg company, suggested that Roesch's method of testing could be used to co-ordinate curves of engine and car performance by using the deceleration test for car performance, and said he had witnessed car tests that showed the economy of gearing the car low. He said he had witnessed an increase in economy of from 18 miles per gallon to 30 miles per gallon by gearing the car as a truck is geared and shifting as necessary. He felt the spark ad-

vance should be susceptible to control according to the throttle opening.

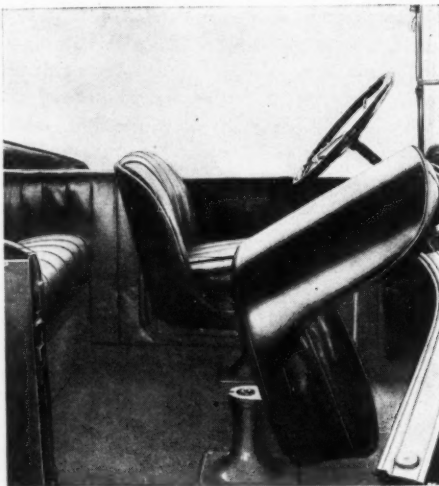
Mr. Cotta, of the Cotta Transmission, stated that there is more inquiry now for four-speed transmission than there has been in recent years.

Franklin Four-Passenger Especially Roomy

THE latest development in four-passenger roadsters, and one which appears to get away from the cramped and crowded rear seat, is announced by the Franklin Automobile Co., Syracuse, N. Y. The unusual roominess is obtained by the use of a very wide door on each side and Pullman-like front seats of the tilting and swivelling type. The wide doors permit entrance to either front or rear seats direct from the curb. Entrance is aided by the tilting feature of the front seats, although passage is sufficient for entrance without pushing these forward. The swivelling feature makes it possible for the front seat passenger to turn about.

The car is gracefully lined and its appearance is further enhanced by a distinctive color scheme. The body is finished in olive brown, as are the wheels, with the upholstery, fenders and axles in black. All painted parts are in dull finish. The top is of a color to blend with the dull brown of the body.

The upholstery leather is unique. It is a black box calf, very soft, and is applied in soft English plaits. There is a hamper in the rear large enough for a suitcase, and provision has been made for attaching small trunks to the running boards.



Seating arrangement of four-passenger Franklin in which entrance to both compartments is gained through the side door of the body

Asked if the test considered with different carbureters took in changes in manifold, etc., which might be necessary as all carbureters do not act the same with the same manifold, Roesch answered that when the manifold is not changed the low resistance carbureter is at a disadvantage on wide open throttle but no attempt was made to change the manifold.

"Carburetion and Manifolding"

Indianapolis, Ind., Dec. 11—The Indiana section of the S. A. E. will meet at the Claypool hotel, December 15, when the subject will be "Carburetion and Manifolding." F. C. Mock, chief engineer of the Stromberg Motor Devices Co., and Professor Berry, of the experimental department of Purdue University, will be the principal speakers.

STAR RUBBER CO. REORGANIZES

Detroit, Dec. 8—The Star Rubber Co., Akron, Ohio, former specialists in druggists' rubber sundries, has given up that phase of production with a complete reorganization. The company was organized in 1906 and began making tires in 1910. L. H. Firey is president.

PREST-O-LITE GETS DAMAGES

Newark, N. J., Dec. 8—The sum of \$3,541.45 damages has been awarded to the Prest-O-Lite Co. by the United States District Court of New Jersey as a result of proceedings against Camille Bournonville and Ida Bournonville of Newark, N. J., growing out of their refilling and sale of Prest-O-Lite tanks and the substitution of refilled tanks.

This judgment is the largest one which has been given to the Prest-O-Lite Co. in its litigation against refillers and dealers and is the result of a lengthy process of accounting by the special master appointed by the Court for that purpose, the costs of which accounting were likewise assessed against the Bournonvilles.

EXPORT MANAGERS TO MEET

New York, Dec. 9—The directors of the National Automobile Chamber of Commerce have agreed to hold a meeting of the export managers of the companies holding membership in the organization in January and exchange ideas on foreign trade. Exports have been increasing every year, and the figures for 1916 will exceed \$160,000,000, more than 81,000 cars to seventy-four different countries.

The conference is expected to collect information regarding changes in duties in foreign countries, customs regulations, shipping routes and charges, special permits, lists of dealers, banking arrangements, road conditions and general uses for various types of motor cars, as well as the possibilities of interesting agents and broadening markets, the handling of the trade after cars have been sold and such

other matters as might be expected to promote sales abroad.

Notwithstanding the shortage in freight cars, which has seriously affected the industry, shipments of motor cars for the month of November were 17,250 carloads as against 17,138 for the same month last year. A report was made of the investigation by the Interstate Commerce Commission regarding the rules and practices of railroads taking interchange cars and it was shown that this service had been seriously impaired by the cars being arbitrarily used in other services.

KENTUCKY MIDLAND IMPROVED

Louisville, Ky., Oct. 8—The inspection party traveling over the Midland trail from Louisville to the West Virginia line, 208 miles, made it with ease in 12 hrs. of actual running time. From Louisville to Owingsville the pike has been reconstructed almost the entire distance. From the latter point on to the West Virginia line the route follows the old natural highway through the mountains over easy grades, which can be improved without excessive cost.

Morehead, the county seat of Bath county, is considering a \$50,000 bond issue, a portion of which is to be used for completing the Midland trail through that county. The adjoining county of Carter has voted \$260,000 worth of road bonds, and the actual construction of its roads is now under way.

Boyd county has lately invested \$400,000 in roads, and that amount is soon to be augmented by another issue. The trail was designated in Kentucky last April.

TO MAKE NEW GEARSHIFT

Pittsburgh, Pa., Dec. 8—The Electro-Pneumatic Gearshift Corp., organized to manufacture the invention from which it takes its name, has announced its purpose to build a plant to produce the electro-pneumatic gearshift. The invention makes use of compressed air contained in a reservoir and fed by a pump driven off the timing gears as actual power for shifting the gears, there being an automatic valve for cutting in the pump when the pressure falls below a predetermined amount.

It is said that the magnetic operation of the valves controlling the air is such that the gears and clutch can be operated at any speed desired. This should eliminate the shock which would be bound to occur if the clutch were engaged automatically always at the same speed. It allows for smooth starting and it also enables the driver to differentiate between a change up and a change down on the gears, operations which should not be performed with quite the same celerity.

The inventor is John J. MacPherson, and the company has been formed with M. F. Metcalf, president and Joseph C. Baird, secretary and treasurer.

Gas Price Hand-in-Hand with H. C. of L.

General Raise of 1 Cent Over Field Made by S. O.—Independents Also Boost

LOS ANGELES, Cal., Dec. 9—The price of motor fuel is evidently going to keep pace with the high cost of living in California. With the public agitating boycotts and forming organizations against increasing prices of commodities, the oil companies have selected the time as opportune to announce an advance in the price of gasoline of 1 cent per gal., making it now retail at 20 cents. The Standard and Union Oil companies are leaders in the movement and the so-called independent producers follow suit.

The price of gasoline in southern California has been raised 9 cents per gal. in

the last 14 months. In September, 1915, it cost only 11 cents retail. The same month, this year, it was 19 cents a gal. With a motor vehicle registration in this county of 66,000 and each car using approximately 3 gal. of gas each day, the oil companies are receiving about \$2,000 more each day since the 1 cent increase went into effect. This means \$60,000 a month or \$720,000 per year additional receipts to the producers in this county alone and the aggregate gain in the state will be in excess of \$7,000,000.

Just what the gasoline business means in California may be ascertained by a little figuring. Counting the per car consumption at 3 gal. daily, Los Angeles county owners were paying, at the rate of 19 cents per gal., \$37,620 per day for fuel. At 20 cents a gal., they are paying almost \$40,000 per day or \$1,200,000 a month or \$14,400,000 a year. For the entire state this means an outlay of \$43,200,000 a year. At 20 cents a gal. gas is costing more than at any time since cars became common, with the exception of a short period in 1912 when it jumped to 24 cents.

The oil companies are claiming it is a matter of supply and demand. They assert the stored supplies of oil are decreasing rapidly and the yield is less than a few years ago. Motorists, however, claim the action is arbitrary and represents a desire to take advantage of increasing consumers to enlarge profits.

GENERAL ADVANCE BY S. O.

Chicago, Dec. 9—The general advance of 1 cent throughout the field was made by the Standard Oil Co., this week the tank wagon basis in Chicago being at present 16½ cents per gal. Prices in the Kansas City district of both standard and independent companies are 15.8 cents per gal., the independents having raised their price 1 cent along with the Standard.

MILWAUKEE GAS UP

Milwaukee, Wis., Dec. 9—Another increase of 1 cent per gal. in gasoline prices in 10 days' time was made public today by both Standard and independent companies in Milwaukee. The previous advance covered only the so-called 65-deg. test, at this time the most popular grade of fuel, but today's raise includes all grades, both for filling station and tank wagon delivery. Current quotations are: 59-deg. test, 17.6 and 16.6 cents per gal., filling station and tank wagon delivery, respectively; 62-deg. test, 21 and 20 cents; 65-deg. test, 25.5 and 24.5 cents; 70-deg. test, 30 and 29 cents.

Tourists Flock to Southland for Winter

WASHINGTON, D. C., Dec. 9—Motor travel between the North and the South is more active than ever before in the history of the nation, according to the figures which are tabulated by the A. A. A. national touring bureaus in Washington and New York.

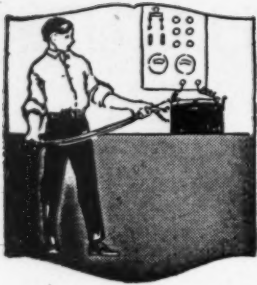
Florida is the principal southern objective at this time of the year. The entire Southland is feeling the effect of the recently established Federal roads co-operation with the states, and from the accumulating state systems are emerging the trunk routes, which mean a growing freight and passenger traffic.

Each of the last 2 years has had an increase of 100 per cent in tourists from the West to the East, and, other than the trips to the California fairs of last year, there has been an increase of eastern tourists into the West of nearly 60 per cent.

Of that doubling from the West, whatever the contributing causes, a notable factor were the cars from the Southwest that have used the National Old Trails route centering at Kansas City, St. Louis and Indianapolis, thence to Wheeling and on to the national capital, where they spread out in fan shape to the New Jersey coast, the New England region, and the New York mountain and lake country.

Tourists from the East have gone into the West and to the coast in numbers fairly evenly divided between the northern routes and the central and southwestern routes, these latter gaining in numbers and popularity with those who started late in the season.

That exact late season road conditions may be known to its touring members, the A. A. A. touring board is sending J. A. Hemstreet, manager of the New York bureau, over this route.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the twenty-fourth installment of a weekly series of articles which began in *Motor Age* issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently. It is expected that the book will be published about May 1.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was taken up and the best methods of connections. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and electro-magnetism then were considered and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. A consideration of electromagnetic regulation followed.

Part XXIV—Electric Motors

IF a wire in which there is a direct current be placed in a magnetic field in such a position that the center of the wire does not correspond in position to the direction of the magnetic field, a force will act on the wire, due to the action of the current in the wire and the magnetic field on each other. This force is present in the generator when the machine is operating and there is a current in the armature, and it tends to cause the armature to revolve in the opposite direction to that in which the gasoline engine is rotating the armature. If the strength of the magnetic field or the value of the current in the wire increases, the position of the two with respect to each other remaining constant, the force tending to move them with respect to each other will increase. The value of the force between the magnetic field and the wire depends on their relative positions; it is at its maximum when the center of the wire and the direction of the magnetic field are at right angles to each other, and at its minimum when the center of the wire and the direction of the magnetic field are parallel to each other.

The production of the force acting on the conductor may be

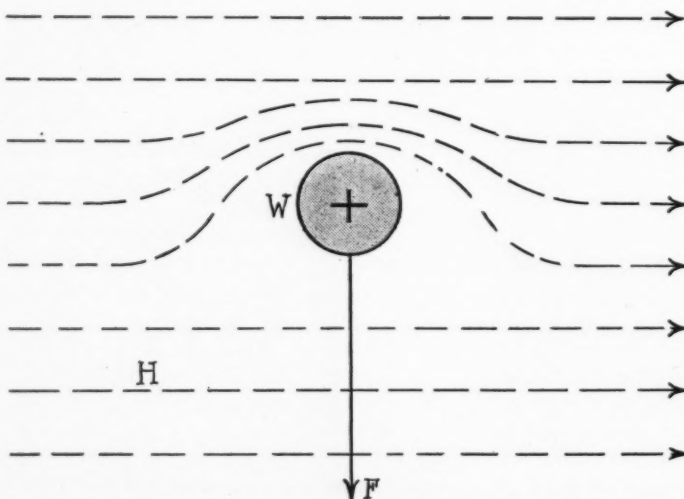


Fig. 158—The force acting on a conductor in which there is a current tends to move it up and down when the conductor is placed in a magnetic field

explained as follows: A conductor, W, carrying a current away from the observer and placed in a magnetic field, H, whose direction is from the left toward the right is shown in Fig. 158. The current in the conductor tends to produce a magnetic field about the conductor in a clockwise direction, which results in the main magnetic field being strengthened on the upper side of the conductor, where the two fields are in the same direction, and weakened on the lower side of the conductor, where the two fields are in opposite directions. As previously explained two magnetic fields cannot exist in the same space at the same time but combine to form a resultant magnetic field. Since the magnetic field is so much stronger on the upper side of the conductor than on the lower side, the conductor is acted on by a force, F, which tends to move it down or toward the bottom of the page.

The Left-Hand, or Motor, Rule

A definite relation exists between the direction of the current in a wire placed in a magnetic field, the direction of the magnetic field and the direction of the force tending to move the wire

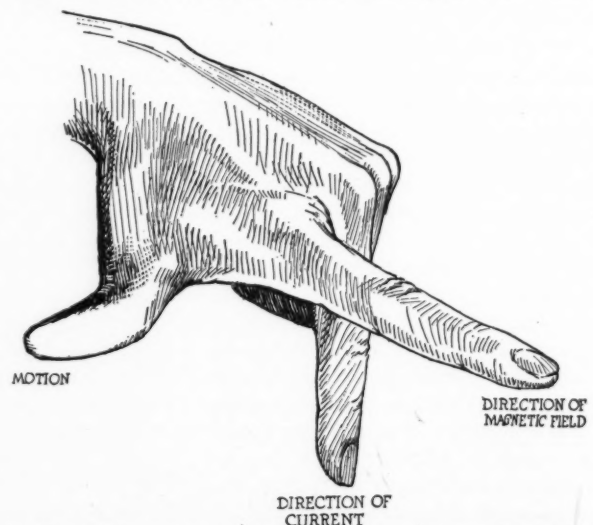


Fig. 159—The left-hand, or motor, rule is used to determine the direction of the conductor's movement when the directions of the conductor's current and the magnetic field are known

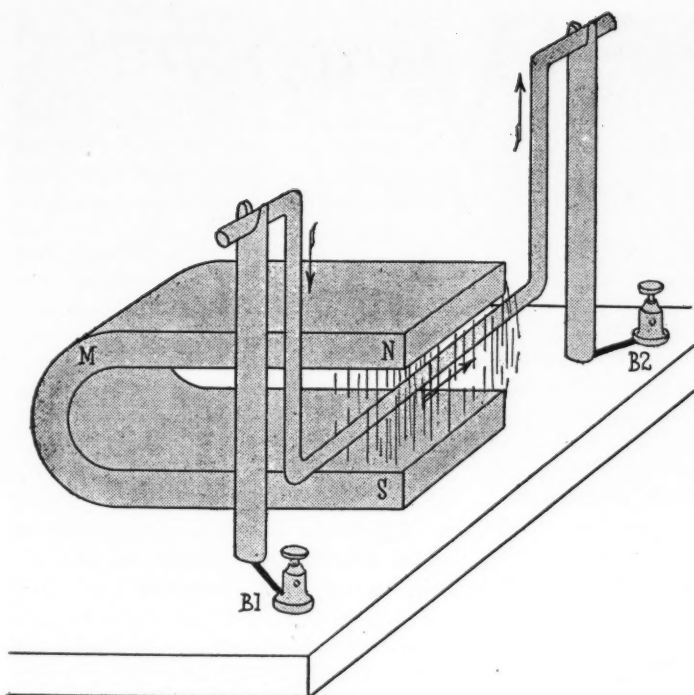


Fig. 160—This simple experiment illustrates the fundamental principles of the direct-current motor and the right-hand rule

with respect to the magnetic field. If the thumb and first and second fingers of the left hand be placed at right angles to each other, Fig. 159, the second finger pointing in the direction of the current in the conductor and the first finger in the direction of the magnetic field, then the thumb will point in the direction in which the conductor will tend to move. This simple rule is known as the left-hand, or motor, rule. If the direction of current in the wire be reversed, the direction of the magnetic field remaining constant, the direction of the force acting on the conductor will be reversed; or, if the direction of the magnetic field be reversed, the direction of current in the wire remaining the same, the

direction of the force on the wire will be reversed. If, however, the direction of the current in the wire and the direction of the magnetic field are both reversed, the direction of the force on the wire will remain the same.

Generator and Motor Interchangeable

The essential parts of a direct-current motor are identical with those of a generator, namely, an armature and a magnetic field. The connection of the wires on the surface of the armature to the external circuit is made by a commutator, which serves to reverse the current in the various parts of the armature winding at the proper time, so that the force acting on the various wires tends to produce rotation in the same direction, and, as a result, continuous rotation of the armature is produced. Any direct-current generator may be used as a direct-current motor, or vice versa, their construction being practically the same.

Simple Experiment Illustrating Fundamental Principle of the Direct-Current Motor and Right-Hand Rule: A simple experiment may be arranged to verify the facts stated in the two previous sections, Fig. 160, which consists of a U-shaped piece of copper wire supported by two metal supports forked at their upper end so that the wire is free to turn and at the same time makes good electrical contact with the supports. The lower ends of the supports are connected to two binding posts as in the figure. A strong permanent magnet, M, is placed with its poles on opposite sides of the wire as indicated in the figure. If a current be sent through the wire, the wire will deflect from its normal position. The degree of this deflection will depend on the value of the current, and the direction of the deflection will depend on the direction of the current in relation to the direction of the magnetic field. When the north pole of the magnet is on the upper side and the current in the wire is in the direction indicated in the figure, the deflection or movement of the wire will be toward the left. If the magnet be turned over, that is, if the field be reversed, the direction of the deflection will be reversed, or if the current be reversed, the direction of the deflection will be reversed. The direction of the deflection will remain unchanged when the direction of the field and the direction of the current are reversed at the same time.

NEXT WEEK

The next installment of the series on Electrical Equipment of the Motor Car will take up the subject of Operation of Two-Part Commutator.

Seventeen Cars for Astor Salon

Cleveland Will Have Accessory Show—Detroit Exhibit Needs More Space

NEW YORK, Dec. 8—The list of seventeen exhibitors at the thirteenth annual motor car salon, to be held in the grand ball room of the Astor, New York, Jan. 2-10. The number of cars to be shown this season, however, is about 40 per cent greater, as is evident by the fact that for the first time the balcony of the Astor's famous ball room is to be used for the overflow.

The various makes of motor cars, both American and foreign, to be exhibited at the salon are: Brewster, Daniels, Isotta-Fraschini, Lancia, Locomobile, Murray, Navara, Phianna, Rolls-Royce, Simplex, Singer, S-S-E and White. Custom body builders who will have separate exhibits are: Brewster, Holbrook, Locke and Rubay. In addition to these seventeen exhibits there will be a half dozen exhibits

of high-grade tires and accessories. There are also two probable additions to the list of motor car exhibitors.

The foreign makes of motor cars are in a marked minority, and only England and Italy remain of the half dozen European nations which were formerly represented at the annual salons.

NEW ACCESSORY SHOW PLANNED

Cleveland, Ohio, Dec. 8 — Cleveland's first motor car accessory show is to be held Jan. 1-6. That every inch of the 12,000 sq. ft. of floor space in the auditorium, where the show will be staged, will be sold is shown by the many applications already made.

The first show promises to demonstrate also the display and advertisement of accessories and parts. Those who have

planned space are designing booths and displays to make the affair attractive not only to the dealers who are looking for new ideas but to those who are looking for better ways of making their cars more comfortable, more useful and more luxurious.

DETROIT SPACE ALL SOLD

Detroit, Dec. 8—Every foot of floor space for the 1917 Detroit motor show has been sold. More space is available at the Billy Sunday tabernacle where the coming show will be held than was at the disposal of the Detroit Automobile Dealers' Association last year, but demands have been so great that members have been held down on space and non-members have been forced to take cut allowances in order to partially meet the demand.



From the Woman's Viewpoint



How to Keep Warm Though Motoring

THE motorist who braves the chill of autumn and the cold of winter no longer is regarded as an intrepid survivor of hardships, but as a most wise and versed adapter of the ways of modernity. For both the science of intellect and the common sense of average people have come to the rescue of the wobbly survivor, to take arms against the little glooms of chill and cold and by supplanting end them. No doubt the most powerful and popular knight in the lists is the closed car, but this by no means ends the chapter on how to keep warm though motoring.

Not only do those whose business it is to see that more cars are sold and those whose business it is to see that more cars are run rack their brains to bring about comfort as an added reason for the increased winter use of motor cars, but the motorist himself and the motorist herself are considering the matter. For, though the market may offer the toreador song of advice on how to keep warm though motoring, it is the motoring public who rejects or approves the toreador song and who, sometimes, produces a toreador song of its own. Witness: The electric heater and the soapstone.

Of course, heretofore your reason for putting up the car during winter has been perfectly satisfactory. It wasn't comfortable, you froze and so on. It was not that it was less convenient to motor during cold weather, but you were less able to appreciate the convenience in cold weather.

That reason now has been taken away. Discomfort is almost a forgotten word in the motorist's dictionary. Manufacturer, motor car and accessory dealers, all have made it their interest to see that discomfort be exiled to foreign parts. And it is to their credit that they have succeeded beyond the wildest dreams of the lay motorist without even falling back on the soapstone and iron of the ice-chilled bedroom of candles and four-posters.

Preparedness Eliminates Storing

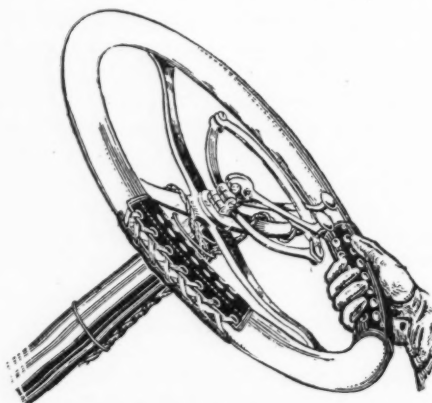
As a result of their success you today fill in the chinks in the garage door and rout out all the creaks and squeaks instead of permanently closing the door as you originally did in cold weather. Instead of forcing the touring car to hibernate you make a closed car out of it, either by buying a winter body or by making use of those various attachments that so economically revolutionize the storm curtains of the regular equipment by opening the doors where none would open before.

The advent of the sedan did much to make the car independent of chill and cold. Its protection from the cold and inclement

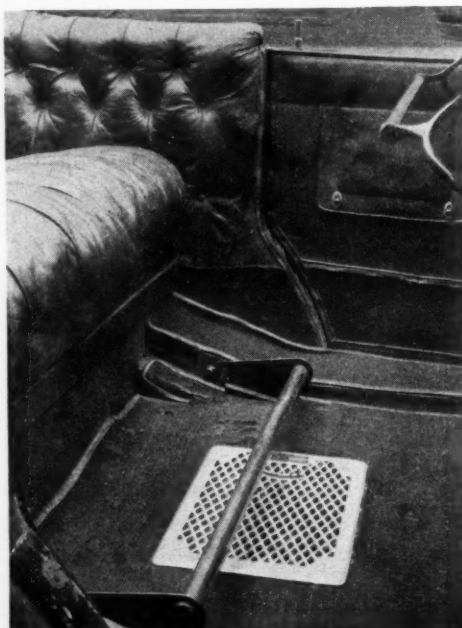
weather also provides enjoyment of warm and milder days. The removal of the windows from the sides accompanies fair skies. Their return defies the coldest day in December. The one car combines the comforts of open car with the quintessence of luxury so long attributed only to the closed car.

In short, winter need not, and seldom does, bother the motorist in the least since the convertible bodies and the divers closed bodies, with their well-appointed interiors that are so ingenious in their addition of motorized firesides, do so much to keep bother away.

First came the medium-priced closed car and the convertible body. Then the field of the radiator was extended to include the car as well as the home, and the solution of the problem looked simple.



A type of warmer for the hands



The radiator in its newly found sphere

Not only has one heater and one foot warmer been adapted to the motor car, but several have been adapted, so that it is possible to pick and choose without having the ultimate of this or none presented to you. Some heaters are so electrically. Some use a smokeless fuel of charcoal. Some use the heat from the exhaust. A foot warmer placed underneath the motor robe keeps the passengers snug. A hand warmer on the steering wheel wards off chilled fingers for the driver.

Exhaust Routs Cold Weather

The portable hand and foot warmers have features of their own. You have met them probably as Japanese hand and foot warmers. They are simple, practical and inexpensive devices made of heavy reinforced tin covered with velvet. They have nothing to get out of order. The fuel tubes furnish their heat and cost little. Each tube burns for from 6 to 10 hr., according to the conditions, and one or two tubes, as desired, are placed in the container at a time. Each tube has a wick on one end, and when this has been lighted the cover is closed tightly to retain the warmth. For a strong heat the warmer can be wrapped in a cloth. The foot warmers are about as long as a woman's foot and about twice as wide. The hand warmers would cover the palm of the hand easily.

As a rule the heater that utilizes the exhaust gas is used when the entire car is to be heated, though the electrical appliances do this also, of course. No matter how cold it is outside, the interior can be kept warm as long as the motor is running. This, by the way, may explain to you why the extravagant motorist permits his motor to run for so long when the car is standing, now that fuel costs so much.

Utilization of the exhaust heat not only routs old man cold weather from the car, but makes use of energy hitherto recognized as wasted. The exhaust is passed through a heating pipe into the tonneau in some types. No odor of gas escapes, as the pipe merely conducts the gas to the tonneau, where it passes out again beneath the floor. Appliances for regulation of the heat are provided. One such heater, which has this advantage of no maintenance cost, is no different from the ordinary foot rest and can, as well as not, remain in the car when not required for heat. It is made of hollow tubing and can be adjusted to the width of the car. One of the brackets connects with the exhaust pipe, taking in the gas, and the other lets the gas escape under the floor.

Another type looks and acts just like

the radiators at home, that is, like those commonly associated with the hot-air furnace. The heat comes from the exhaust and passes through a tube radiator, which has a protective cover situated flush with the floor of the tonneau. A flexible pipe leads the exhaust gas to the radiator, and a valve similar to that in the ordinary hot-air register may be moved by the foot to control the heat.

Heaters Are Unobtrusive

There is also an electric heater and footrest that appears no different from the ordinary foot rest. Wires lead to it unobtrusively. The current is supplied by the storage battery. When the heater has reached a high enough temperature to give a comfortable heat the current can be switched off, and the footrest will give off heat for a while without current.

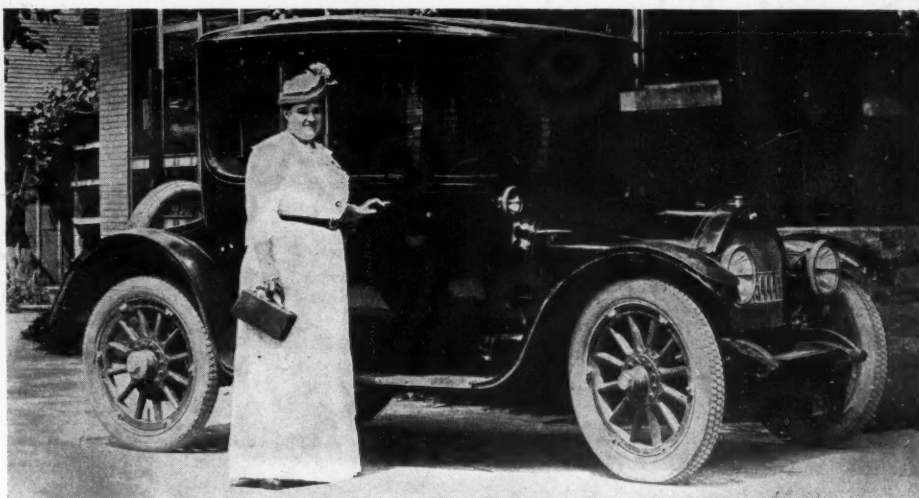
Nor need you suffer from the cold if you drive, for the driver is far from neglected. An electrical steering wheel heater that is operated by the storage battery is made for attachment to the wheel. It can be fastened on the upper or lower side and is controlled by a switch. One type conforms to the shape of the wheel. Another furnishes only warmth of a grip's width. This last comes in pairs, each of leather studded with metal discs and laced into the position occupied by the hands. The heat given off is steady and holds no danger of burns for hands or gloves.

But do not believe that it is to science as advocated by the manufacturer and dealer that you must always look for comfort in motoring. No indeed. The woman with the hairpin has extended her activities to the car, and the results of her discoveries are many and blessed.

We are told that such and such a home-made method is a sure dispeller of the uncomfortable glooms. For instance, if you wrap strips of felt or broadcloth tightly around the steering wheel and glue them with rubber cement—presto! gone aching are the antonyms of pleasantness. One is tempted to try it in preference to the electrical devices of moneyed advocacy.

Are you acquainted with the hot water bottle? What, may come the question, must we go back to the days of the soapstone in spite of modernity? Well, anyway, again we are told that the joys of the hot water bottle have not all been told. One woman uses it, guised in a less utilitarian cover, it is true, as a hand warmer. Another considers it the best homemade cure-all there is for a balky engine. A half-hour application is advised. One contends that the hot water can be retained without replenishing for 10 or even 12 hr. when extra covering is supplied. Another asserts that nothing is more simple than to replenish it as the water in the radiator may become heated in the course of a run of considerable length.

But the motor robe comes in for the most suggestions. Some agree that, given free hand with the robes, no heaters will



Doctor Richardson and her Willys-Knight are ready to make calls

be necessary. Be that as it may, they are very pleasant adjuncts to the various heaters and a course in etiquette on their observance, as it is practiced among fellow

She Motorizes Her Work

THERE are some professions that seem to demand the motor car as an accessory to their continued pursuit, and the medical profession is one of these. So what is more logical than that Dr. Ethyl Richardson possess a garage as well as a medicine case in following her practice in and around Quincy, Ill.? The combination of garage and case has worked together through both fair and stormy weather, for the car has carried the doctor and her medicine case over mud and snow and ice with no more serious mishaps than the ordinary punctures that are the common lot of all motorists.

Doctor Richardson uses a Willys-Knight coupe. She does her own tire-changing whenever necessary and has had no other road trouble. For gasoline and oil she depends on the service station. The service station also mends the punctured tires and does the pumping. She does not find it difficult to change her tires, however, as they have demountable rims.

The car has been run about 5,000 miles since October, 1915. Many of the calls are from the country, and 100 miles a day is not unusual. The roads within a radius of 20 miles of Quincy are bad, Doctor Richardson says, but so far she has had no trouble but an occasional puncture. She carries extra Fisk tires on rims, and it is a matter of only a few minutes when she does have to make a tire change.

Doctor Richardson's family consists of herself and her mother. So satisfactory do they find the coupe that her mother usually goes along also. As the car has convenient lights and the windows are quickly and easily opened or closed as the temperature may warrant, her mother takes something to read with her and is very comfortable while the call is being made.

motorists, is not amiss. In short, your education is incomplete without it.

Does your motor robe persist in slipping? The harness shop has some accessories that would help you. They are called snaps and dees. The formula also calls for a leather strap and there are several combinations that get the same answer, security. One way is to fasten the dee, which, by the way, is simply a piece of metal in the shape of the letter D, by a rivet or brad, to the back of the seat. Then the snap attached to one end of the leather strap, the other end of which is sewed to the robe, if it is cloth, or riveted, if it is fur, is fastened to the dee when the robe is adjusted, holding all safely in place.

Or the leather strap can be equipped with dee and snap and its center fastened to one corner of the robe, so that that corner can be thus fastened to a projection at the side of the tonneau seat. Or a longer strap may be used and the robe fastened about the waist—or neck, if it is desirable to have the robe protect the chest also.

Holding the Robe in Place

Several have found it expedient to attach thumbless mittens just under the top edge of the robe, so the hands can be slipped in. These serve a double mission of extra warmth for hand and greater security for robe. It even happens that larger attachments of the same nature are made and attached to the lower edge. This last device might prove valuable for you as driver, as the foot covering would keep the robe away from the intricacies of driving as well as bring added comfort.

If your ears are sensitive and you do not wish to wear some engulfing scarf or cap to cover them, it would be wise to use cotton for this purpose as this is an equal protection against cold in motoring and water in swimming.

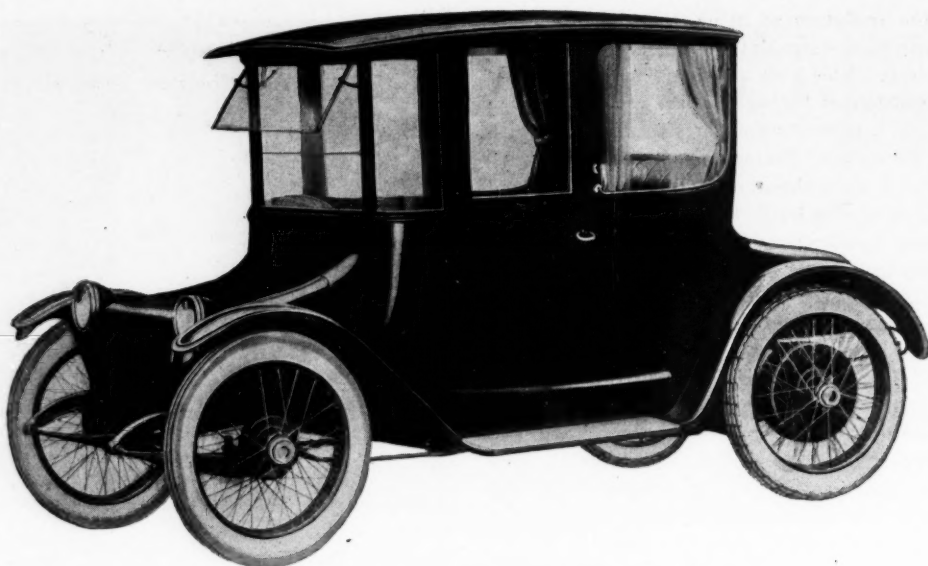
It would be unwise to say that this at all completes the list of accessories. It doesn't. One is born every minute. But the devices offered here are fair representatives of advice available on how to keep warm through motoring.

Detroit Electrics Cost \$500 Less

Scientific Production Factor in Big Reduc- tion of 1917 Price

THE price of Detroit electrics made by the Anderson Electric Car Co., Detroit, Mich., has been reduced \$1,100 in 2 years. The 1917 cut calls for \$500, while those of a year ago were from \$600 to \$725. This cut in price does not imply that the new model is in any way inferior to the old. The great reduction is attributed to the installation of efficiency methods in production including chain assembly and the standardization of parts with the reduction of color and upholstery options. The same materials are being used throughout, but are being finished in special automatic machinery and other short cuts in modern scientific production.

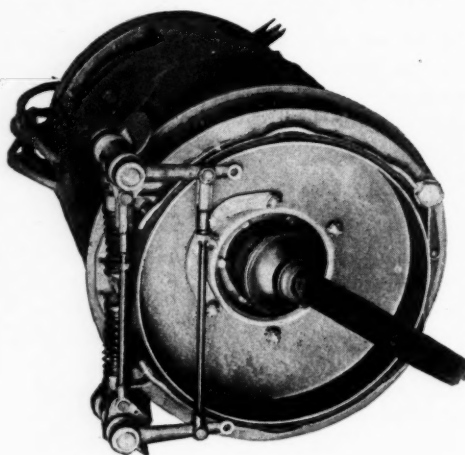
The principle changes, outside of the reduction of color and upholstery options are a reduction in tire size from 34 by 4½ to 33 by 4½, a change in the spring suspension from elliptic rear to semi-elliptic all around and a reduction in brake sizes and weights of minor parts due to the general weight reduction in the new body. The more expensive chassis, with its op-



Exterior view of the model 68 Detroit electric brougham

tion features is continued for the coming season.

A feature which has lowered material cost and at the same time been a big attribute in weight reduction is the use of



Anderson electric motor assembly used in the model 68 Detroit electric

leather for roofing in place of sheet aluminum. It is well to remember that any reduction in weight in an electric car goes to increase the mileage per charge. Other

weight-reducing factors are the adoption of Hotchkiss drive in the semi-elliptic form of suspension, and the smaller wheel sizes. The lighter weight permits a smaller battery, the new one being a forty-two cell, thirteen-plate in place of the forty-two cell fifteen-plate, which is said to give the same mileage as the more expensive and heavy model.

Uses Pressed Steel

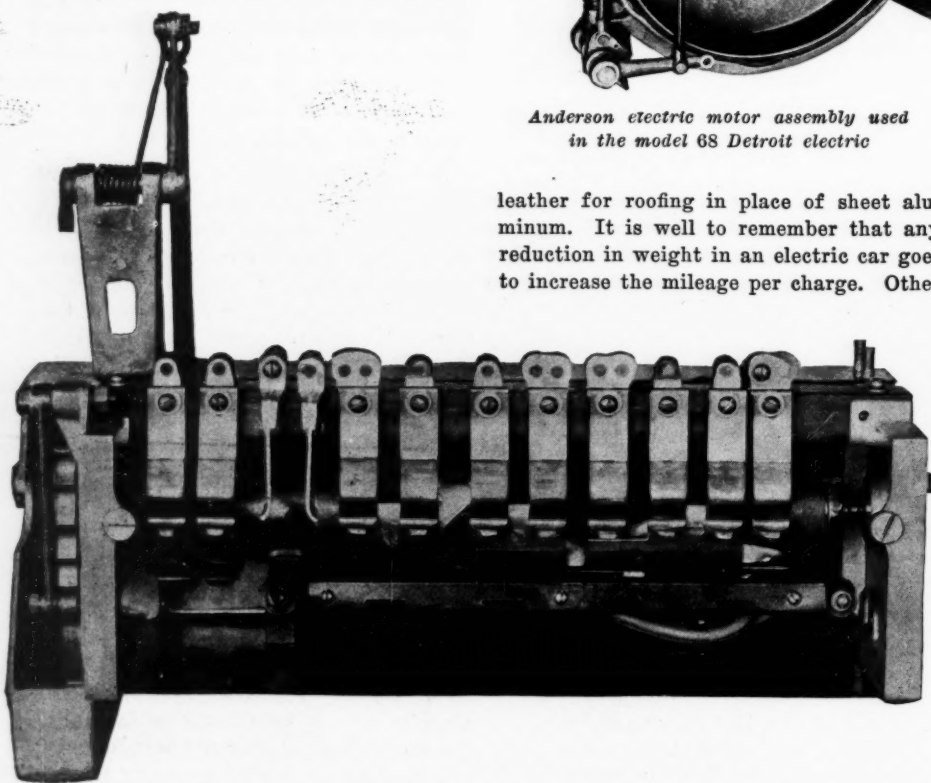
The structural work of the chassis in this new model which is known as the model 68, is pressed steel. All assembly is done in the Anderson factory. Automatic hammers hot-rivet the cross-members, brackets and gusset plates and the cross members serve to carry the electric motor and the driving units. The motor is supported in the center and the batteries are equally divided front and rear, creating a well-balanced chassis.

All of the wiring is made up as a unit before it is assembled to the chassis by special cleats. All wiring, with the exception of that for the body lights is carried on the chassis.

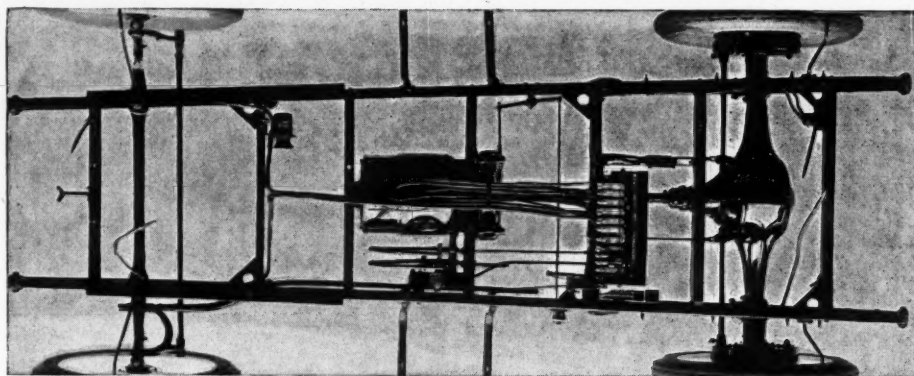
Timken bearings are used in the wheels with ball bearings for the steering parts and at the knuckles. The friction points in the majority of instances are equipped with self-lubricating bushings and the others with grease and oil cups accessibly located. The standard tire equipment is the Goodrich Silvertown cord.

High-ribbed jars are used in the new Detroit Electric batteries. These ribs are sufficiently high to hold all the active material which will come off the plates during their normal life, thus making a non-wash battery, or one that does not require washing. The purpose of this is to give the user more total life as some of the active material is always lost during washing.

Weight is saved in the battery by making it the thin-plate type. It has been found that the thin plates give about the same capacity as the thick plates formerly used since it is only the surfaces of the



The light-fingered controller assembly as applied to the standardized Detroit electric



Plan view of Detroit electric chassis showing mounting of motor on frame cross-members and wiring unit

plates which really form the active working parts and capacity is a question of area rather than plate volume. With the less weight per plate the new battery has a greater capacity per pound than possible with the old construction. More plates can be placed in each jar, thus reducing the current used per plate and adding to the life of the battery. The Anderson company now guarantees a battery for 8,000 miles or 2 years normal service. The capacity of the model 68 is 150 amp. hrs.

A series-wound motor of slow speed characteristics is used on model 68. The feature of a series motor is that the torque increases with the load, and the electric car is thus enabled to increase its output to accommodate for adverse road conditions. By using the slow-speed motor, reduction gears have been eliminated with a saving of weight and an increase in transmission efficiency.

Direct drive through a short propeller shaft with two universals transmits the power to the three-quarter floating axle. The drive is through spiral bevel gears. Two separate sets of brakes are provided.

In finish and equipment, the electric brougham affords a vehicle of fine appearance. The fenders are pressed steel, oval-crowned designed and are skirted to the body, protecting it against mud. The

standard painting is cobalt blue with white stripes. The wheels are painted in white, cream, red or blue, as specified. The upholstery offers a selection of three designs of whip-cord. It is Turkish type with deep cushions padded with curled hair. With the 100-in. wheelbase chassis a capacity of four passengers is provided.

Body features have always been carefully looked after in electrics and the new Detroit incorporates a number of comfort features. There is an upholstered package box in the left front corner which may also be used as a passenger seat. In summer weather the windows may be lowered by a patent device. The door windows are sashless and are operated by a lever from the inside. The seat widths are generous, the rear seat being 49 in. with 18 in. depth, the door opening 24 in., and the distance from the front to the rear window, 63½ in. Houk wire wheels are furnished exclusively on this model.

DODGE CONVERTIBLE SEDAN

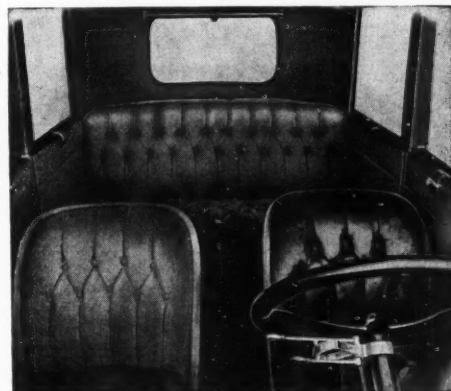
The general lines of the Dodge convertible sedan just offered for the winter sales show an absence of extreme lines and a graceful appearance. The color panel is deep blue and this is outlined by a cream stripe. The cowl, body front, fenders and hood are black and the wire wheels are

cream colored to match the stripe. This, together with the flat top, creates a conservative yet distinctive appearance.

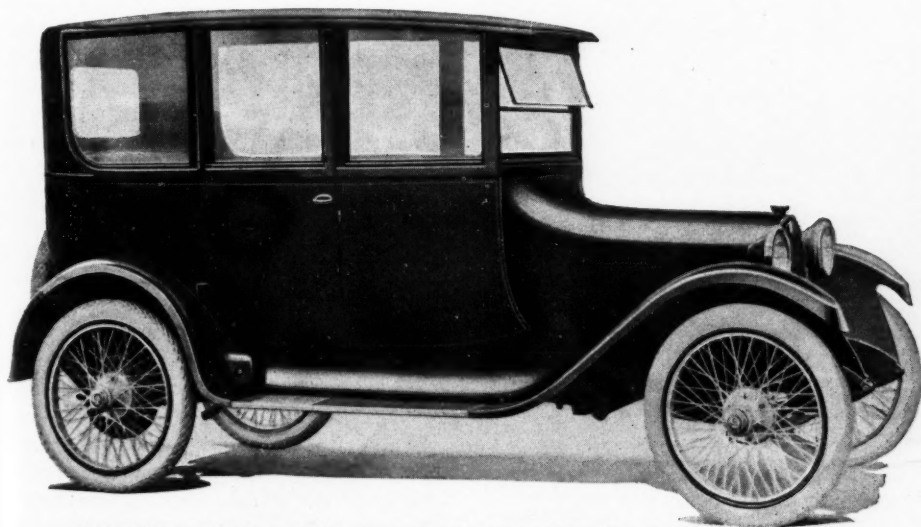
Looking into the interior the general color scheme is gray with a tint of blue. A striped effect is carried out in the curtain and flexible robe cords, while the carpet and front-compartment floor are in gray to match. Gray upholstery covers the turkish-type cushions. All fittings are nickel plated.

There is an aisle separating the two compartments between the divided front seats. The driver's seat is finished in dull-finish leather and the front passenger seat, which is slightly ahead of that of the driver, is upholstered in cloth to correspond with the rear seat cushions.

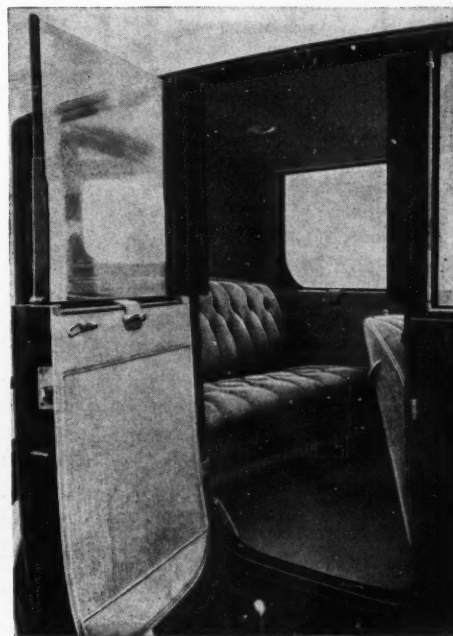
The car embodies the convertible feature in which the windows may be lowered in a few minutes' time to provide an open car. The rear side windows have a recess in a narrow compartment back of the rear-seat cushions, and the other windows lower from view, the pillars being removable. The price is \$1,185.



Dodge convertible sedan interior



Straight lines conservatively proportioned characterize the new Dodge convertible sedan



Wide door into rear compartment of Dodge convertible sedan

Interesting Recent Developments

A CONCEALED-TOP feature and a number of other distinctive innovations appear in the four-passenger body for Mercer chassis designed and built by George R. Bentel, Los Angeles distributor for Mercer cars. It has been named the Coronado sport model.

When not in use, the top drops down within the body walls of the car and a specially built compartment that encases the rear seat. To raise the one-man top, it is only necessary to unlock the nickled plates and draw it forward into position.

Deeply upholstered, sloping seats with individual arm rests insure perfect comfort to the occupants. An arm rest is provided also for the front seat beside the driver's. The front seats are divided and there are but two doors to the car. The speedster idea is carried further by the absence of running boards. A single nickled step provides access on each side.

Incorporated in the equipment is a disk wheel of Mr. Bentel's own design, also. These disks are highly polished in brass or nickle finish and are adaptable for use either on rod or wire spokes. The disk is not a part of the wheel, but simply a plate that is attached, one on each side. Besides keeping out dirt and grime, the highly polished finish gives a decidedly scintillating effect to the wheels, when in motion.

ALLEN RATCHET AXLE

The Allen Compensating Axle Mfg. Co., Philadelphia, Pa., will soon market a new design for passenger cars or trucks, having a ratchet drive and a simple automatic device for holding one of the rear wheels rigidly to the driving mechanism for reversing or when the axle drives the engine.

A sleeve is driven by the bevel gear and drives positively two engaging pieces which are connected rigidly to the road wheels. In forward driving springs keep the ratchets engaged, but when a turn is made the outer road wheel overruns the clutch on that side releasing against its spring. It is stated that the click of the ratchet cannot be heard while this is taking place.

When the direction of drive is reversed a central member is moved to the right by the action of a pin and helical slot. This causes the right end of the central member to engage a jaw clutch, so taking the drive direct to the right road wheel. This happens when the reverse gear is engaged and also when the axle over-runs the engine. During the engagement of this reverse clutch the forward clutch releases against its spring, but the clutch at the other end is held out of engagement positively, being drawn back by the movement of the central member.

As soon as forward drive recommences



Three-quarter rear view of special body on Mercer chassis, in which the top disappears in a recess provided for it in the rear

the movement of the pin in the helical slot releases the reverse clutch and allows the main clutches to operate as before.

With this axle it is not possible to spin a wheel that loses traction, so there is al-

ways driving power for the wheel that has traction, except on the reverse where only one wheel can be used.

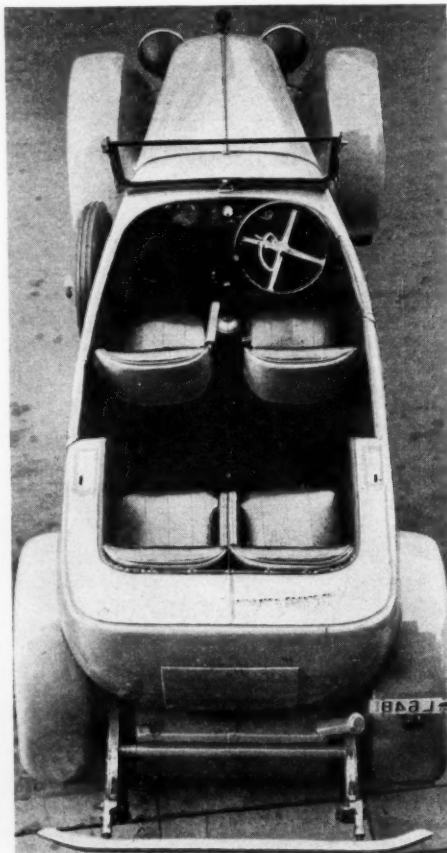
BAKER PRESSED STEEL WHEEL

A pressed-steel tension wheel is soon to be marketed by the United States Wheel Corp., a concern to be organized by Erle K. Baker, inventor of the wheel, and Charles G. Hawley, both officers of the Universal Rim Co. Mr. Baker is president and Mr. Hawley secretary of the latter organization. The present business is being conducted under the name of the Baker Wheel & Rim Co., Chicago, which is a holding organization capitalized at \$5,000.

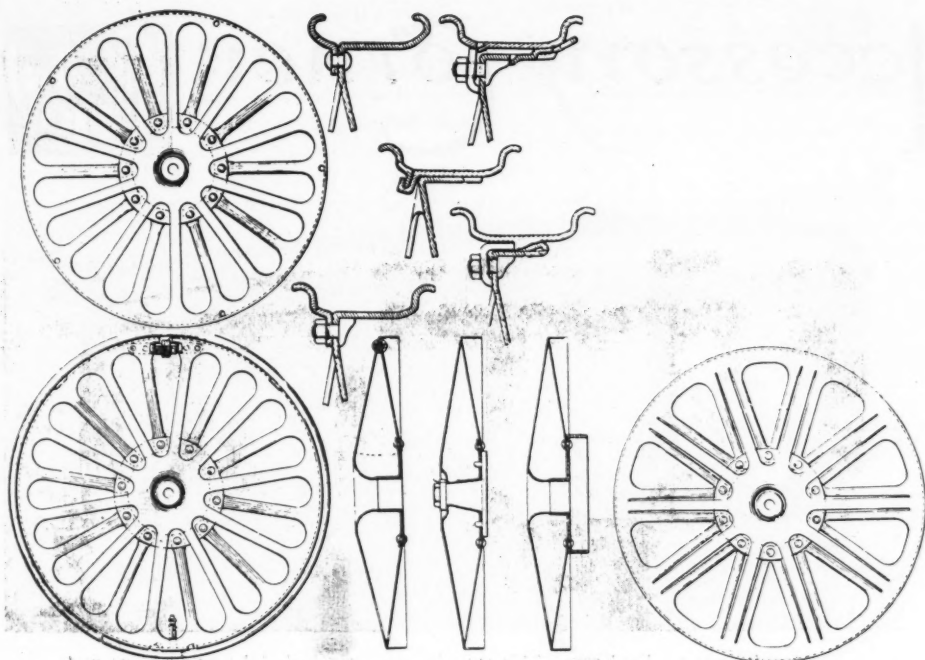
Simplicity characterizes the design of the wheel. A sheet of steel is punched and formed into the entire wheel with the exception of one of the hub flanges and a portion of the hub. The metal is put under tension by the method of assembling, in which every alternate spoke is drawn to opposite ends of the hub.

In the demountable rim feature of construction the felloe is severed and a turnbuckle inserted in the cut portion. This turnbuckle serves to contract the rim when the rim is being applied. Driving studs are located on either side of the tire valve, while on the opposite side of the wheel adjoining the turn buckle on each side are bolted latches which engage slots in the rim, insuring a solid mounting.

Other styles permit the application of the standard Baker demountable rim, in which the rim is seated on the conical flange of the wheel. In this construction the rim is held in place by lateral pressure of the ordinary lugs.



Plan view of special body on Mercer chassis. The doors for the disappearing top are shown. The car is without running boards



Various types offered in the Baker pressed-steel tension wheel. At the bottom left is shown the Turnbuckle construction for demountable wheel mounting

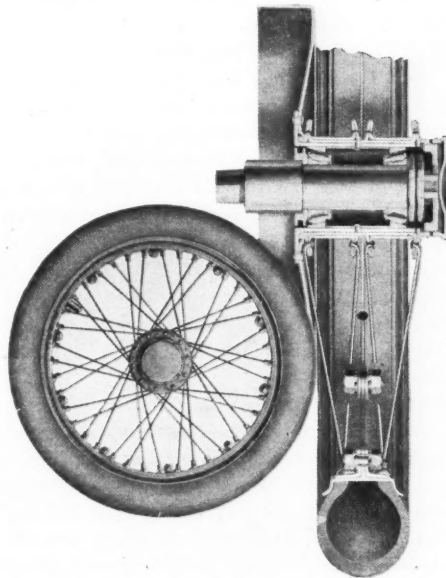
The wheel has been designed for every application, and because of its construction permits of a very low manufacturing cost.

LINDSAY TWIN WIRE WHEEL

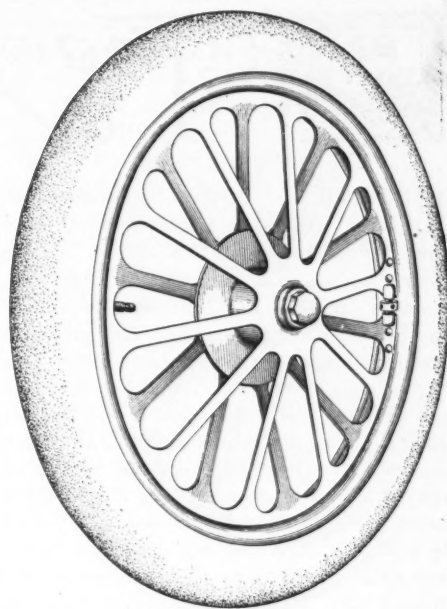
The component parts of the twin wire wheel invented by T. J. Lindsay, 708 Fletcher Trust building, Indianapolis, are assembled into two complete self-contained wheel sections or units. The two wheel sections are suitably fastened together so as to form a unitary whole. There are eighty spokes that connect the rim parts and hub parts together, and the wheel as a whole is mounted on the inner fixed hub and interlocks with it, also interlocking with the web of the brake drum.

It is claimed that the wheel has all the functions of a demountable rim, and of a demountable wheel, and that it may be produced at a price far lower than can either of the other types.

The demountable rim feature of the new



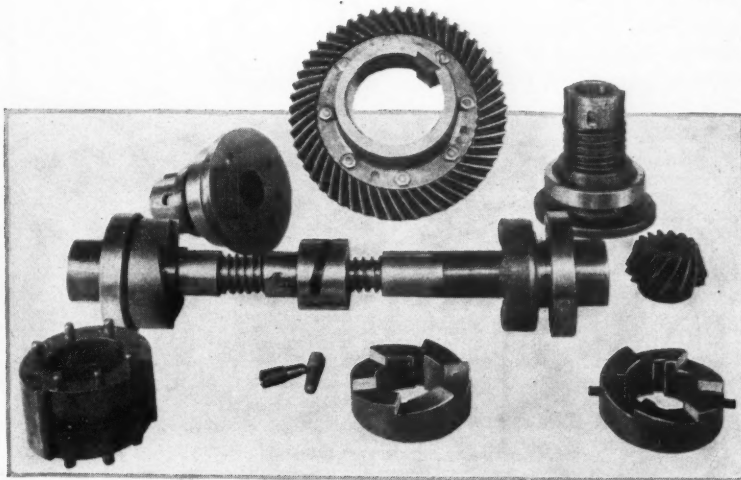
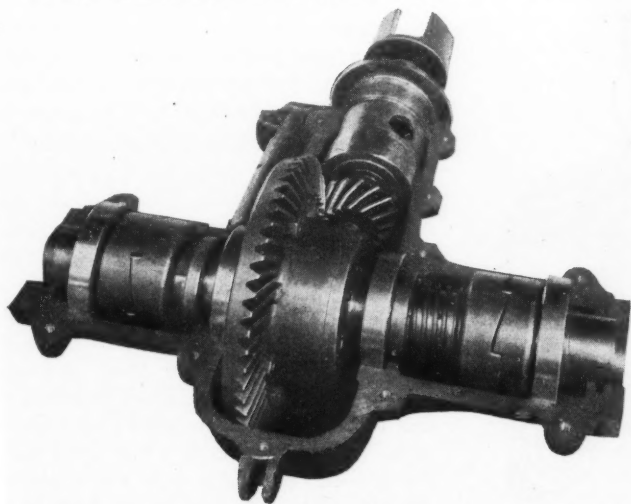
Lindsay twin wire wheel, a quick detachable, demountable and removable unit combined



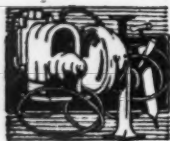
Baker steel wheel of the demountable type which may be contracted by means of a turnbuckle for ease in mounting

wheel may be applied to truck and passenger car use. By removing the rim bolts with a wrench and taking off the hub dust cap, the outer twin wheel can be dismounted, leaving the inner wheel intact, thereby releasing the tire. It is evident that this twin structure can be used as a demountable wheel, a demountable rim or a quick detachable rim, as the user may elect. In other words the user may carry a special tire, or use the rim as a quick-detachable rim.

The form of structure gives two rows of spokes, laced in each side of the wheel, thereby taking care of the side-thrust from either side equally. The tire rim is mounted between the two conical felloe rims of the two wheel sections and is held in place by the rim bolts, thus making it secure. As the tire rim is held in place between the two wheel rims and by the rim bolts, it may be readily observed that the wheel rims and tire rims will expand and contract together.



Assembly and parts of Allen ratchet type differential which, because of its construction, affords positive differential action



The Accessory Corner



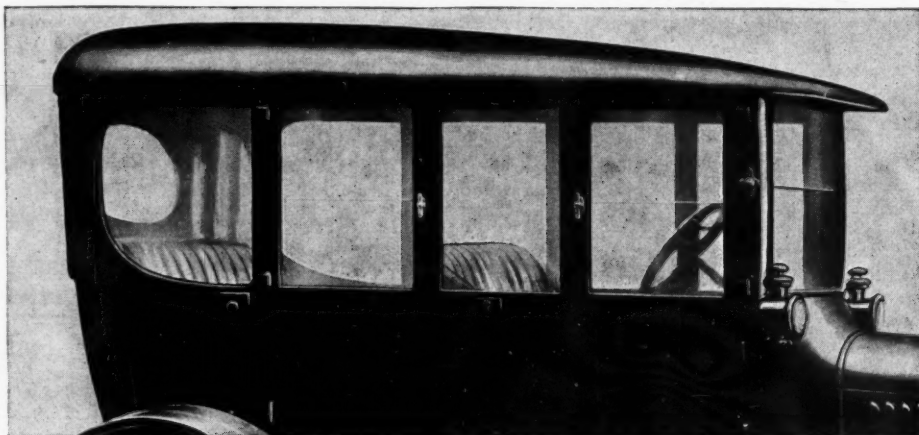
EBONITE is claimed to be entirely different from other solid lubricants in that it does not separate should it become heated to a liquid. Its long, stringy consistency enables the lubricant to follow the gears rather than splash and produces a spongy film over the gear teeth which prevents metal-to-metal contact, thus reducing wear. The statement is made that Ebonite has been run in gearsets an entire season without needing replenishment, and that if a gearset does not leak it will serve indefinitely without deterioration. The oil is produced from the highest-grade Pennsylvania crude by the Bayerson Oil Works, Erie, Pa., an independent concern, makers of autocrat motor oil.

For Repairing Scored Cylinders

The outfit consists of an apparatus for applying nickle and silver into the scored portions of a cylinder interior. There are two arc-shaped scrapers to permit a flush application with the surface of the cylinder walls, a package of suitable flux to attach the alloy to the cylinder walls and enough composition to repair from five to seven cylinders. The process is guaranteed and it is claimed that an amateur repairman can do the work. The complete outfit sells for \$5 and is marketed by the Wilkes-Barre Welding Co., Wilkes-Barre, Pa.

Cotter-Pin Puller

This is a tool which will pull any size cotter pin, at any angle regardless of its inaccessibility. It straightens the pins and holds them from dropping into vital parts of the car. The puller resembles a pair of plyers and operates by inserting a prong into the loop of the cotter pin with a clamping action effected against the loop of the cotter when the levers are pinched together. The price is \$1.25. The address of the concern which markets the device



Sedan top for use on Ford cars. This may be quickly attached by an amateur and may be purchased with ventilating windows if desired

is May's Cotter Pin Puller, 19 Peachtree street, Atlanta, Ga.

Wrench for Oil-Testing Cocks

The Dow Wire & Iron Works, Louisville, Ky., has placed on the market a wrench for opening and closing the oil-testing pet cocks on Ford cars. The handle, which is made of heavy wire with a loop on the end, has an overall length of 25 in., permitting one to reach the cocks readily without climbing under the car. The wrench is finished in black enamel. It is supposed to be carried under the front seat cushion or some other accessible place. Price, 25 cents.

Piston Ring Which Fills Groove

Working on the belief that the worst leak in piston rings is not at the joints but rather all around the ring between the sides and walls of the groove and under the ring, the Sealwell has been designed to take up all lateral as well as all circumferential wear and to fill the groove completely at all times. The ring is composed of two eccentric units, an inner ring

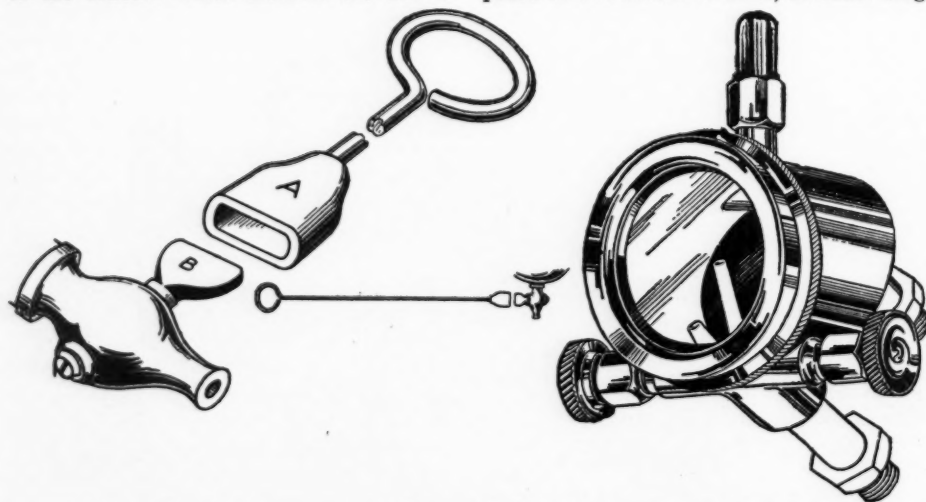
externally beveled and an outer ring internally beveled, with the beveled surfaces in contact with each other. The inner ring has a tendency to spring outward and acts as a wedge to keep both rings in contact with the walls of the groove. Each ring covers the joint of the other and for this reason, it is claimed, it is impossible for the joints to leak. The rings list for \$1 to \$2.25 each depending on the size. Sealwell Piston Ring Co., 532 Davidson Building, Sioux City, Ia.

Easily-Applied Primer

This primer, which is attached to the dash, is connected with the feed line and the proper amount of gasoline is injected into the manifold of the motor just before cranking. The stem is threaded and when the primer is not in use, a few turns of the handle will close the valve, preventing leakage. The makers claim to have overcome the difficulty of the leather plunger in the pump drying out by combining two different materials in its makeup. Special fittings are furnished that will adapt the primer to any car, with full directions given in each outfit. The price complete, with tubing and connections, is \$5. Ideal Brass Works, Indianapolis, Ind.

Inclosed Tops for Use on Fords

A complete line of winter tops for Ford cars are produced by the Anchor Buggy Co., Cincinnati, Ohio. The Anchor sedan is priced complete at \$77.50, ready to install. The makers can furnish drop ventilating windows equipped with anti-rattling attachments, for \$10 extra for both front and rear or \$5 extra for front windows only. The side panels are so constructed that by removing a few bolts they may be easily detached, making a full open body for summer use. All tops are made of pressed steel with a large oval glass in the rear. The roof is solid-deck panel,



Left—Wrench for turning oil-testing cocks on Ford motor. Right—Control system and sight feed in water-gas carburetor

heavily padded and covered with waterproof upholstery material. The inside is attractively lined with whipcord cloth. The front posts are made of wood, highly polished, and fit snugly around the windshield. The entire top weighs 150 pounds. Another product is a coupe top for use on Ford roadsters. This sells complete for \$62.50 with \$5 extra for ventilating windows.

Folding Camping Bed

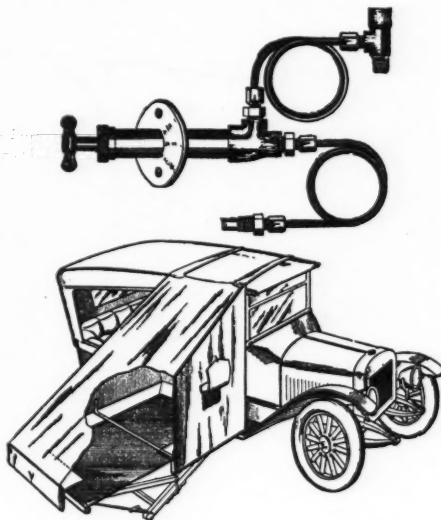
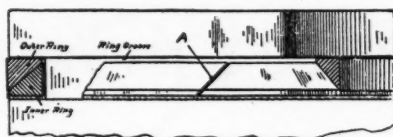
The No. 1 Casey single-bed outfit consists of one complete bed, a weather-proof tent, with side-wall pockets, and a 68 by 94-in. poncho. It is very compact, really consisting of two sticks $4\frac{1}{2}$ ft. long and a cloth bundle weighing about 15 lbs. The price is \$25 in duck-skin fabric and \$20.03 in storm-shield cloth. The No. 2 double-bed outfit consists of a 4 ft. 6 in. by 6 ft. 7 in. double bed, a weather proof tent with side-wall pockets, and a packing sack 54-in. long made of heavy khaki. The price is \$43.45 and \$44.95, depending on the material. The No. 4 outfit is a complete family equipment to be packed on the running board. There is a quad bed consisting of a twin unit of two full-sized beds. With one of these outfits for each running board four roomy sleeping quarters are possible. The outfit weighs 120 lbs., and sells for \$64.20 and \$67.70 depending on the material. These outfits are marketed by the Water Gas Carburetor Co., Kansas City, Mo., makers of the water gas carburetor, which, briefly, is a device to convert water from an extra tank provided with the outfit, into steam generated in coils wrapped about the exhaust manifold, passing this steam into the intake manifold. It combines a dash outfit which is a sight feed double-jet instrument controlled by an air-balanced governor to prevent overfeeding or underfeeding of the motor at various engine speeds. The water is drawn through the instrument by the suction of the intake manifold, while the adjustment for feeding water at the rate of sixty to 120 drops a minute is controlled by a needle valve. The price of this outfit is \$18.

Repair Stand for Ford Motors

A portable repair stand for supporting the Ford motor in any desired position is a product of the Ekern Bros. Mfg. Co., Flandreau, S. D. In its construction a triangular upright is braced and supported on a U-shaped base mounted on castors, and carries the motor on a plate which is bolted to it. This plate is attached to the stand by means of a pinch bearing, and the motor is bolted to the stand through the two water-inlet cap screws. The pinch bearing permits the motor to be revolved and locked in any desired position. The stand is 34-in. high and weighs 50 lbs. Price, \$20.

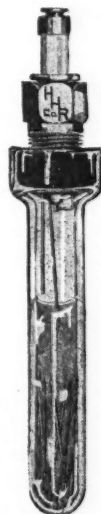
Portable Cranes for Shops

Heavy work may be lifted and carried to any part of the shop with the Canton portable crane. A U-shaped semi-steel base

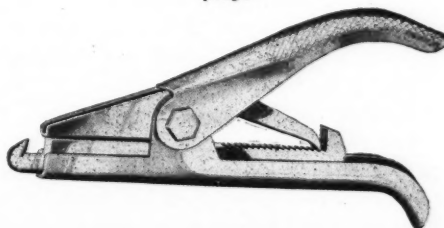


Above—Constructional features of Seal-well piston ring, in which one ring wedges against another to create a gas-tight fit. Center—Priming system with pump for dash attachment. Below—Combination bed and tent which folds onto running board

is mounted on castors and on this is carried an overhanging vertical arm, having a height of $7\frac{1}{2}$ ft. The arm is reinforced on the back with a heavy iron strap, and carries block, chain and hoist. The hoist is operated by crank and is fitted with a ratchet which permits the load to be locked at any height. The front castors are eccentric mounted and by raising the handle



Device for cleaning carbon from spark plugs



Cotter pin puller for inaccessible places

the weight of the crane is taken from the wheels and the base allowed to rest on the floor, locking the crane to the floor. The crane has a capacity of 5,000 lbs. and costs \$125. Canton Foundry & Machine Co., Canton, Ohio.

Novel Spark Plug Cleaner

This device comprises a glass tube about 5 inches long which contains about fifty steel needles. There is a bushing in the open end into which the spark plug is screwed. To clean a plug fill the tube about half full of gasoline, screw the spark plug in the bushing and shake like a salt shaker. The steel needles pick away the carbon from the porcelain and the gasoline dissolves the oil deposit. Price, 50 cents. Manufactured by the Harry H. Reynolds Co., Chicago.

Combination Valve Tool

A valve re-coating, re-facing and grinding tool for the Ford is marketed by C. Spiro Mfg. Co., New York. It consists of two tool steel cutters, that may be adjusted for resurfacing the valve seats, and a double pointed Ford valve grinding tool, all held in a special handle. For facing the valve, the valve is clamped in a vice, the special handle slipped over the valve stem, and the face of the valve scraped down by the tool steel cutter. The valve-reseating cutter is held on a rod inserted in the valve guide, and refaced by a special cutter, after which the valve and seat are ground to the desired finish. Price, \$1.50.

Cowl Light for Fords

A small light, fitted into the cowl, beneath the windshield, and receiving its current from the magneto, for lighting the front compartment of the Ford is a product of the Gasco Mfg. Co., Lancaster, Pa. The clips holding the wiring and the lamp are caught beneath the windshield angle iron, and are said to be inconspicuous and simple to attach. Price, \$1.

Automatic Lectroflater

This is an electric-driven air compressor, mounted on, and directly connected to a storage tank, for supplying compressed air to the garage. The feature of the device is the automatic switch, that starts the pump when the pressure has dropped, and automatically stops it when the pressure is again up to the required amount. It comprises a unit outfit, and is mounted on skids, ready for use when received, and is said to require no attention, except packing with grease every three months. Black & Decker Mfg. Co., Baltimore, Md. Price, \$125 complete.

Presto Auto Paint Kit

A complete outfit for refinishing a motor car is marketed by the American Automobile Accessories Co., 621 Main street, Cincinnati. Paint, varnish, rubbing material, rubber-set brush and full instructions are included. It is supplied only in the black, enough being supplied for one small car. Two outfits are required for a large car. Price, \$3.



The Readers' Clearing House



WOULD MAKE DODGE INTO RACER

Reader Plans to Enter Rebuilt Car in Wisconsin Racing Events

MILWAUKEE, Wis.—Editor Motor Age—There has recently been started the Wisconsin Racing Association for amateur drivers. Races will be held on the ½-mile tracks in this state and on the 1-mile track in this city. I intend to enter in these races and will appreciate it if you will answer the following:

1—What is the timing of the Dodge stock car?

2—What would be a good timing for speed work for this car? It will be used for speed work only. Would it be advisable to enlarge the valves and have a special camshaft made?

3—We had some amateur races here a short time ago. I was especially interested in the manner in which they had the oiling systems arranged. I noticed that some of the cars had two pumps. Do they force the oil from the tank to the crankcase by air, or does it pass through the pump? I noticed only one oil line and cannot understand why they had two pumps. Is it possible that one of the pumps is for gas? Is it necessary to have a pump for gas?

4—Kindly illustrate an auxiliary oiling system.

5—Does it require a gauge or a valve so as not to force too much oil into the crankcase? Also show and explain how it is connected at the crankcase.

6—Explain correct method of fitting piston rings.

7—What is meant by lapping in piston rings? 8—I have noticed you are often asked for the method of timing motors, and your answer usually is in degrees. I would like to know how it would be possible to find a certain number of degrees if there were no marks on the flywheel or timing gears? Would this require some kind of an instrument?

9—Do you figure 360 degrees in a circle?

10—What is meant by porting a motor?

11—How is the Master carburetor adjusted?

—Earl Becker.

1—When the Dodge is properly timed the intake opens 8 deg. past center. Make this setting for one of the cylinders and it will be correct for all cylinders.

2—There is little advantage gained by setting the valves ahead, although a tooth of the gears might make a slight difference in the high speed. Larger valves would undoubtedly make some difference in the speed. Not over ⅛ in. could be safely added without weakening the cylinder casting dangerously. A camshaft designed for high speed, one with quicker cam lifts and earlier openings of the intake and exhaust, would increase the speed.

3—The two pumps were for pressure in the gasoline tank and delivery of oil to the motor crankcase. The oil is forced directly through the pump. A pump is necessary for gas when the gas tank is on the rear of the car, at a level below the carburetor, unless perhaps a vacuum tank is used. Pressure feed of gasoline is almost universal practice in racing car construction.

4—Auxiliary oil pump arrangement is shown in Fig. 2. The pump draws oil from the oil tank in the rear and forces it into the crankcase.

5—Race drivers do not usually use gages. They determine whether the motor is over-oiled or under-oiled by the way it operates. A motor traveling at a sustained

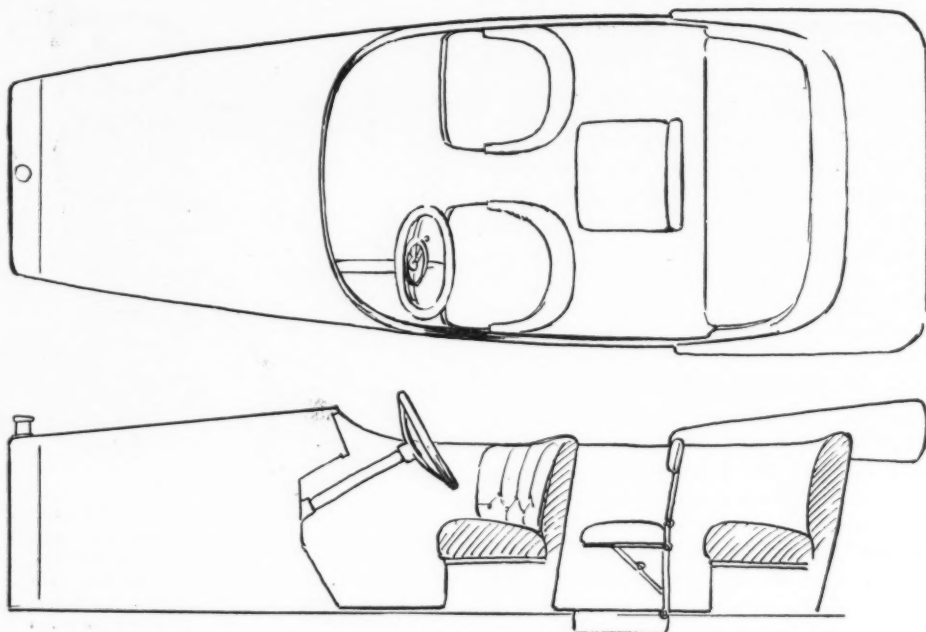


Fig. 1—Reader's suggestion to provide chummy seating for three passengers in a five-passenger touring car

maximum speed requires a great deal of oil for proper lubrication and much pumping can be done without drowning the motor.

6—Unless parts are perfectly interchangeable, piston rings should be purchased a few thousandths oversize and fitted into the slots by hand. This is a matter of carefully dressing down the sides with a fine file and emery cloth so that the rings drop into the slot at the closest fit possible, still allowing them to expand and contract without sticking.

7—The lapping process is performed by inserting the piston with the new rings fitted into a cylinder in the inner surface of which a grinding compound is inserted. Movement of the piston up and down within the cylinder will grind, or lap, the rings to a true surface on the cylinder.

8—Refer to Fig. 3. This shows a simple method of setting valves by the degree method with the use of a protractor. With the piston set at top center in cylinder No. 1, make a mark at the top of the flywheel, the mark to be on a direct vertical plane with the center of the motor shaft. Then, with the aid of the protractor set off the specified number of degrees to the left, make a mark, move this mark into the vertical plane and connect the camshaft gears.

9—Yes.

10—Porting means the drilling of holes through the cylinder casting at the bottom of the stroke. These ports are intended to give an open-air exit to a portion of the burned gases when the cylinder reaches the

bottom of the explosion stroke, thus assisting scavenging of the motor.

11—There is no adjustment to the Miller carburetor unless you might call the choke assembly for cold-weather starting an adjustment. The proper setting is made at the factory.

WIRING TWO PLUGS IN PARALLEL Spark Would Pass Through Least Resistance in All Probability.

Pennant, Sask.—Editor Motor Age—Would a gauze-wire gasket placed between the carburetor hinder the flow of air sufficiently to affect the running of the motor?

2—Which would be the better for lighting, a 12- or 24-volt battery?

3—Does Motor Age know of any books on the subject of steam motor cars?

4—Who manufactures the Pierce motorcycle?

5—I intend replacing the priming cups with spark plugs and connecting in series with plug already in motor. Will a Bosch high-tension magneto cause a spark in both plugs, or will it spark in the plug offering least resistance? It will cost \$6 to change the motor. Would it benefit the motor?

6—How can one tell when the motor is properly placed in the frame?

7—Kindly state how to adjust a Schebler model R carburetor. I am unable to get the motor to work properly at low speeds.—James C. Barber.

1—Very likely it would, although it might not. It is a matter to be experimented with.

2—As a matter of power of the lights one battery will give as much candle power as the other. It is the ampere-hour capacity that determines this.

3—Volume 5 of the Cyclopedia of Automobile Engineering, published by the American Technical Society, Chicago, is partially devoted to the history and development of steam cars.

4—Pierce Cycle Co., Buffalo, N. Y.

5—It is likely that the plug with the

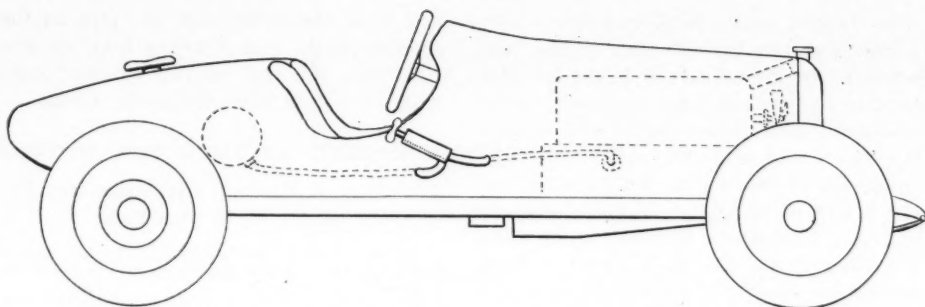


Fig. 2—Suggested method of connecting oil pump on side of racer body with oil tank in rear and motor crankcase

least resistance would do the firing, unless the points were closely and very equally adjusted.

6—We hardly know what you mean. In present day motor cars the suspension is fixed, and when the motor is bolted to its supports it is bound to be properly located unless the supports or frame have been thrown out of line. In any case, the universal joints will take up any small defect in alignment.

7—Before adjusting the carbureter, make sure that the ignition is properly timed and that you have a hot spark at each plug; that the valves are properly timed and seated, and that all connections between the intake valves and carbureter are tight, and there are no air leaks of any kind in these connections. Also the carbureter should be adjusted to the motor at normal running temperature.

Refer to Fig. 6. By turning the air-valve cap A clockwise, the needle valve E is lifted out of the nozzle and enriches the mixture. The reverse adjustment makes the mixture lean. When the motor is cold or the car has been standing, move the steering column, or dash control lever towards "gas" or "rich," which lifts the needle E out of the gasoline nozzle and makes a rich mixture for starting. As the motor warms up move the control level gradually back towards "air" or "lean" to obtain the best running conditions until the motor reaches normal temperature. For best economy and power the slow speed adjustment should be as lean as possible.

If the motor does not fire properly turn valve cap A until the motor runs properly at low speed. Then advance the spark three-quarters of the way on the quadrant. If the engine backfires on quick acceleration of the throttle turn up the adjusting screw F, which increases the tension on the air valve spring, until acceleration is satisfactory.

READER SUGGESTS NEW BODY TYPE

Car to Serve for Five or Three Passengers with Sociable Feature

Fort Atkinson, Wis.—Editor Motor Age—The accompanying sketch gives an idea for a new arrangement of seats in motor cars which may perhaps be of interest to you or to some of your motor car advertisers.

I am about to buy a car and want a five-passenger car because, while there are but three in the family, we may want to take friends with us at times. However, the five-passenger car does not quite meet our desires, because

when only three are in the car one person must of necessity be alone in the back seat. Were it not for the occasional need of five seats, the cloverleaf design would suit our purpose.

Why cannot the arrangement be such as to place three passengers close together for sociability when desired, yet have five seats whenever needed? In other words, why not have a five-passenger car which could be converted into a cloverleaf arrangement of seating?

In a car with an aisle between the two front seats, this could be accomplished by means of a detachable or collapsible seat to swing into place back of the aisle, the aisle furnishing the needed leg room.—E. W. Simons.

An elaboration of your sketch with a side view of the conception of the body we draw from your description is given in Fig. 1. This auxiliary seat could also serve as a place for a sixth passenger. The idea surely has merit and there is no idea why there should not be a demand for such a body.

LAMBERT'S RECORD-MAKING CAR

Talbot Racer Has 272.36-cu. in. Motor, Size 4 in. by 5 in.

Antioch, Tenn.—Editor Motor Age—Could Motor Age give any information with regard to the car driven several years ago by Percy Lambert? It was a very light car, about 200-cu. in. motor. If the account which I saw was true, it was faster than anything on the track to-

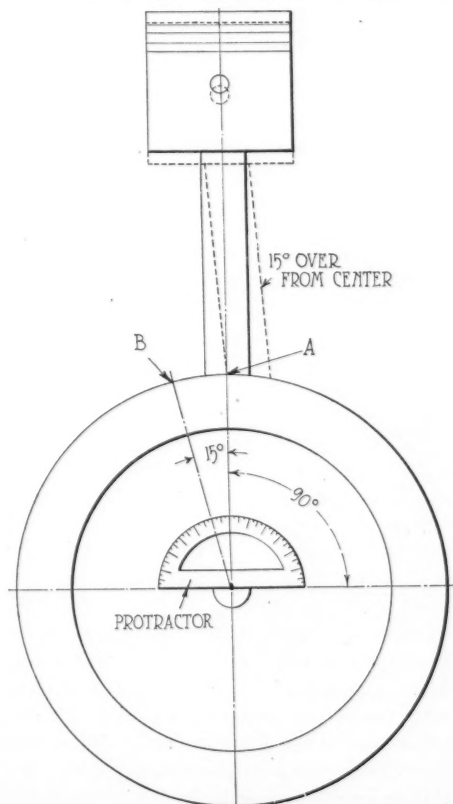


Fig. 3—Method of setting valve timing with a protractor

day, considering its size. Lambert was trying for the hour record and was traveling at the rate of 114 m.p.h. when a rear tire gave way. That was the last of him and the car also. If the account was true, I think he was at Brooklands, Eng.—Wm. Morrow.

The most information concerning the Talbot car that is available is that it was rated at 25.6 h.p. and had a four-cylinder motor with 4-in. bore and 5.5-in. stroke, this giving a piston displacement of 272.36 cu. in. It was so geared that, when traveling at 114 m.p.h. the motor was operating at 2,800 r.p.m. It was equipped with Palmer cord tires.

In 1913 Lambert drove the car 103 mi. 1,470 yds. in 60 min., thereby establishing a world's record. In the same year on Oct. 10 a twelve-cylinder Sunbeam raised this record to 107.96 mi. in 60 min. On October 31, 1913, Lambert again attempted to break the record in the small Talbot car, and it was in this attempt that one of the wheels crumpled beneath him when traveling at the rate of 114 m.p.h.

MOORE MULTIPLE-EXHAUST SYSTEM

Diagram of Explanation of Two Way Method of Piping

Edwardsville, Ill.—Is the Moore multiple-exhaust system a system using the injector principle? If not, please show the difference, and if they are the same, explain this principle.

2—What specifications must a car fulfill to be eligible to the Chicago Ford race and similar Ford races?

3—Give the name and address of the concern making R-W wire wheels.

4—Who makes the S. G. V. car?

5—Has aluminum ever been tried out extensively as a material for connecting rods, and with what results?

6—What disadvantages has the aluminum connecting rod?—W. C. Gillham.

1—The Moore multiple-exhaust system, as applied to the Lexington cars, is shown in Fig. 7. It is a two-pipe, two muffler system in which, in this particular case, each pipe and each muffler takes care of three cylinders. The division of gases is done to reduce back pressure.

2—In the last Ford race it seemed to be that the car must bear only some semblance of a Ford motor to be qualified. Several of the cars were Ford in cylinder block only. This will be probably more rigid in future races of this kind. There have been no definite requirements adopted.

3—Standard Roller Bearing Co., Philadelphia, Pa.

4—This car is no longer made. Parts may be obtained from the S. G. V. Co., 500 Central avenue, Newark, N. J.

5-6—It has been tried out extensively but has not been adopted. Aluminum alloy alone has not sufficient tensile strength to withstand the strain imposed upon this part.

DELCO THIRD-BRUSH REGULATION

Definition of Hotchkiss Drive and Explanation of Vacuum System

Kansas City, Mo.—Editor Motor Age—Give a diagram and explain the use of the relay as used in the Delco system on the Buick and Oakland cars.

2—Explain the Hotchkiss drive, and explain the following from page 41 of the October 5 issue of Motor Age: "The rear springs take the torque and drive through the Hotchkiss principle."

3—What is the torsion tube?

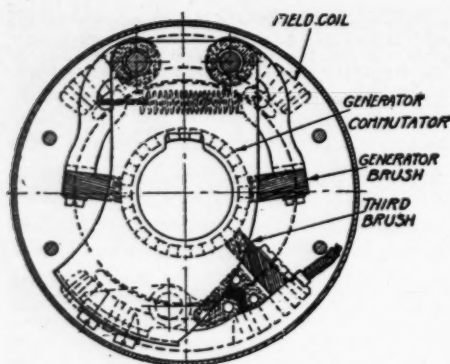


Fig. 4—Plan view of Delco third-brush system of generator regulation

4—Explain the multiple-disk type clutch.
5—Explain the parts and their relation of the vacuum feed system.—Fred Floyd.

1—On account of the variable speed at which the armature is driven it is necessary to provide a means of regulating the output of the generator to obtain sufficient charge at low speed without excessive charge at high speeds. This is performed by what is known as third-brush excitation. Refer to Fig. 4. Moving the third brush in the direction of rotation increases the charging rate, and moving it in the opposite direction decreases the rate of charge. When little or no current is flowing in the armature winding the magnetic field, produced by the field coil, is approximately straight through the armature from one pole piece to the other, as indicated by A in Fig. 5. The voltage which is generated by each armature coil is practically uniform during the time the coil is under the pole pieces.

In the generator, in which 7 volts are generated between the main brushes, it is evident that approximately 5 volts would be generated between D and the third brush E, these 5 volts being what is applied to the shunt field winding. As the charging current increases, this charging current flowing through the armature windings produces the magnetic field in the direction of the arrow B.

This distorts the magnetic field produced by the shunt field winding and, instead of the magnetism being equally distributed under the pole pieces, it is dense in the pole tips marked F and G. Thus, the armature coils no longer generate the same voltage under different parts of the pole pieces, with the result that, although the generator voltage across the main brushes remains near 7 volts, the greater part of this is generated by the coils connected to the commutator between the third brush E and the brush C, these coils being in the region of the dense field as shown by the coil P, and a small part of the total voltage is generated by the coil connected between the brushes D and E, as a greater number of these coils are in the region of the weak field as indicated by the coil O. This applies a lower voltage to the field winding, with the result that the magnetic field is weakened and the output of the generator is decreased.

2—Torsion is that force by which a body tends to return to rest after it has been rotated. In a rear axle it is the twisting tendency of the rear axle as opposed to the stationary parts which house and support it. The strain must be taken care of by rigid support between the axle housing and the frame of the car. In the Hotchkiss principle this strain is taken up through the rear springs. The main leaves of these springs are made proportionately strong to carry the torsional load.

3—The torsion tube is generally in the form of a tubular housing enclosing the drive shaft with rigid support to the differential housing in the rear and forked support to the gearset in the front. The forks are generally floated between two springs to take care of the forward and backward movement of the drive shaft and consequently of the tube due to the action of the springs.

4—A multiple-disk clutch is a friction unit composed of a number of disks of steel, brass, asbestos composition or a combination of these. The disks are one

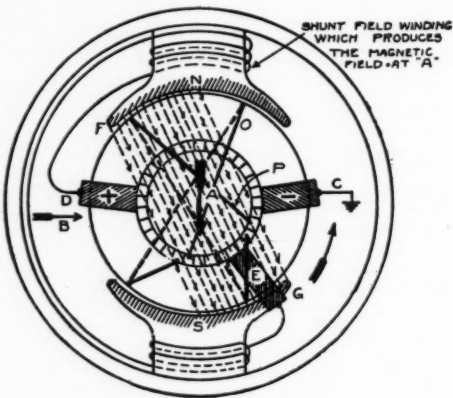


Fig. 5—View to explain regulation principle in Delco third-brush system

against the other between the motor and the gearset, and when tension is applied to them, namely, when they are pressed together, they first slip, allowing gradual engagement between the motor and gearset, and then, when maximum required pressure is applied, they lock together by the surface or skin friction, and the drive is locked between the motor and gearset. The tension is gained through a heavy coil spring controlled by the clutch pedal.

5—The vacuum feed system has as its function drawing of fuel from a certain level to a higher level without need of applying pressure. Applied to a motor car, with a gasoline tank suspended on the rear of a car, the carburetor must naturally be at a considerably higher level. The fuel is raised by means of the vacuum tank. Fundamentally the vacuum tank is a cylinder connected at the top through a pipe with the intake manifold and through another pipe to the gasoline tank. When the motor is turned over the downstroke of the pistons creates a suction in the intake manifold. This suction is conducted to the vacuum tank through the connecting pipe,

and from thence through the pipe to the gasoline tank, thus drawing fuel, by suction, into the well of the vacuum tank, where the level is controlled by a float.

KEROSENE AS FUEL FOR MOTORS

Principles of Harroun Carburetor and Development in This Field

Brown Valley, Minn.—Editor Motor Age—What are the general principles of the Harroun kerosene carburetor?

2—How does it differ from the ordinary carburetor, and is the same intake manifold used?

3—Is this carburetor on the market at the present time?

4—Are there any devices except the above mentioned, being manufactured, which will burn kerosene? If so, how do they work?

5—Is there anything like the device shown on page 46 of the August 3 issue of Motor Age being manufactured, either for kerosene or part kerosene?

6—What is the main trouble experienced in perfecting a device that will successfully burn kerosene in the ordinary motor?—A Subscriber.

1—In the Harroun carburetor exhaust heat is used to vaporize the fuel. The application of the heat is made after the fuel has been partially atomized and mixed with a small portion of air. The fuel in the float chamber is not heated, as this would interfere with the float mechanism. The spray nozzle is opened and closed automatically by the auxiliary air valve. There is but one adjustment on the carburetor which may be operated from a dash control.

2—The basic difference in this carburetor and ordinary instruments is that a large proportion of the hot gases from the exhaust manifold is passed around the venturi tube. The manifold connections are the same.

3—Invincible Mfg. Co., Pittsburgh, Pa.

4—There are a good many new devices on the market which are said to burn kerosene satisfactorily, although there are very few which have existed long enough to prove their worth. In most of them heat is utilized to assist in vaporizing the kerosene, which is, of course, far less volatile than gasoline. In some there are provisions for breaking up the fuel in very fine particles, atomizing it, before it is mixed with the air.

5—This device will be marketed in the

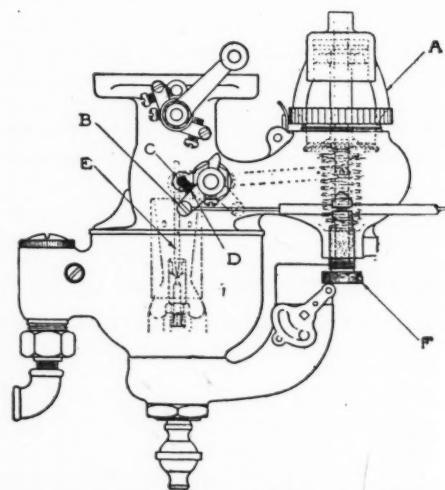


Fig. 6—Diagram to show method of adjustment of Schebler model R carburetor

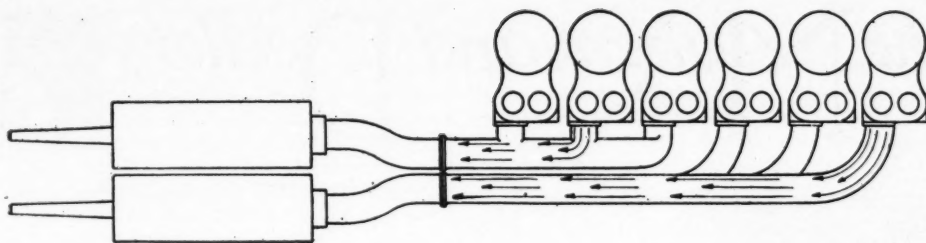


Fig. 7—Plan view of Moore multiple-exhaust system with arrows showing exit of gases without back pressure

near future if the present plans of the inventor work out.

6—In successfully transforming the liquid into vapor. Because of its weight in comparison with gasoline, it requires more heat or more vigorous atomizing to break up the liquid into a proper vapor mixture.

FILTRATION OF LUBRICATING OIL Although the Practice Is Common It Is Not Advised by Motor Age

Red Oak, Ia.—Editor Motor Age—Is the advice contained in the following paragraph particularly vicious, and would this be likely to result in serious damage to a motor car engine? As I understand it, the lubricating qualities of oil are greatly deteriorated by the heat of a gasoline engine and filtering this oil would not in any way restore its valuable properties. Is not this the case?

"Every motorist knows that it is desirable to draw off the oil from the crankcase at frequent intervals. Many drivers simply throw this oil away, but this is a mistake. It is perfectly possible to filter the oil and having cleaned it of impurities to use it again in the engine. The foreign matter found in oil drawn off from the car is metallic powder, chips of carbon and similar grit, which cause wear on the bearings and in the final event choke up the oil pipes. A simple filter for use in this connection may be made from a large tin can of about a 5-gallon size. A piece of muslin is suspended over the top of the can and in this is placed a deep layer of sawdust. Possibly the best way is to stitch the end of the muslin to a muslin ring which will fit over the top of the can. The oil is poured into the sawdust, which retains all the foreign substances. It is a good plan to drill a hole and put in a faucet or tap about an inch from the bottom of the can. In this way the cleansed oil may be drawn off, while any sediment that may be left will remain in the bottom of the can below the level of the tap."—Thomas D. Murphy.

Lubricating oil when subjected to heat and fire is deteriorated. That is its lubricating qualities are reduced. No manner of straining will bring back the qualities it has lost. Straining of oil is a common thing, however, and it is probably the case that one straining does not produce oil so inferior as to harm the motor. It is the advice of Motor Age that fresh oil only be used and that the crankcase be drained at least four times a season.

SAYS HIS CHALMERS IS TOO SLOW Car Not Designed for Speed—Adjustments Must Be Right

Rochester, Ind.—Editor Motor Age—I have a Chalmers 6-30 which will make from 45 to 50 m. p. h. Is this car not supposed to go from 55 to 60 m. p. h.? I have seen other Chalmers cars do better than 55 m. p. h. What will increase the speed?

2—Is it easy to put a cut-out on one? If so, give the names of some concerns handling these.

—A. Robbins.

1—Maximum speed of a car is in direct proportion to the state of adjustment, lubrication and care. Two cars of the same model and of exactly the same specifications may have a speed variance of 5 m. p. h. The owner of the faster car has every adjustment perfect, the car thor-

oughly and properly lubricated, the tires properly inflated and a motor interior which is neither too tight nor too loose. If the needle-valve lever of a carbureter

Communications Received and Inquiries Answered

Earl Becker.....Milwaukee, Wis.
James C. Barker.....Pennant, Sask.
William Morrow.....Antioch, Tenn.
W. C. Gilham.....Edwardsville, Ill.
E. W. Simons.....Fort Atkinson, Wis.
Fred Floyd.....Kansas City, Mo.
A Subscriber.....Brown Valley, Minn.
A. Robbins.....Rochester, Ind.
Leslie S. Little.....Wittenberg, Wis.
Thomas D. Murphy.....Red Oak, Iowa
Harold B. Burwell.....Peoria, Ill.

No communication not signed by the inquirer's full name and address will be answered in this department.

is $\frac{1}{8}$ inch off from the proper adjustment the maximum speed may vary 5 m. p. h. or more. The same is true if the valves have too much play, or if a number of other parts are out of adjustment. This

car is not supposed to make any set maximum speed. It was not designed for a maximum speed, as is true of practically every motor car on the market. It is designed for maximum efficiency at ordinary operating speeds, taking whatever maximum it will. If you must have a racer gear the car up, but remember that a higher gearing will give you less flexibility at lower speeds.

2—There are a great number of cut-outs manufactured which are applicable to practically all makes of cars. The list of cut-out manufacturers is too long to publish here, but we might state that you can obtain a suitable device from any good motor car supply house in the country, and very likely your own garage would gladly get one for you.

Rebabbitting Connecting Rods

Wittenberg, Wis.—Editor Motor Age—Explain the method of rebabbitting connecting-rod bearings. In my motor there seems to be only a thin layer of babbitt metal over the brasses.—Leslie S. Little.

You cannot rebabbit the bearings yourself. If you have the split type and the bearings are loose, that is, if with all adjustments taken up there is a play between the connecting rod and the crankshaft, then you should purchase new bearings. If the rods are still tight there is no need of worry. If, by any chance, you have an old motor with solid bearings in which the babbitt metal is poured into the hole in the connecting rod, the complete rod should be sent back to the factory for rebabbitting.

Last But Not Least

**ANTI-FREEZING
RADIATOR SOLUTIONS**

Alcohol and Water

For zero weather use water, 75%; alcohol, 25%.

For 10 below zero, water 70%; alcohol, 30%.

For 20 below zero, water 60%; alcohol, 40%.

Glycerine and Alcohol

Not lower than 5 below:

Alcohol	15%
Glycerine	15%
Water	70%

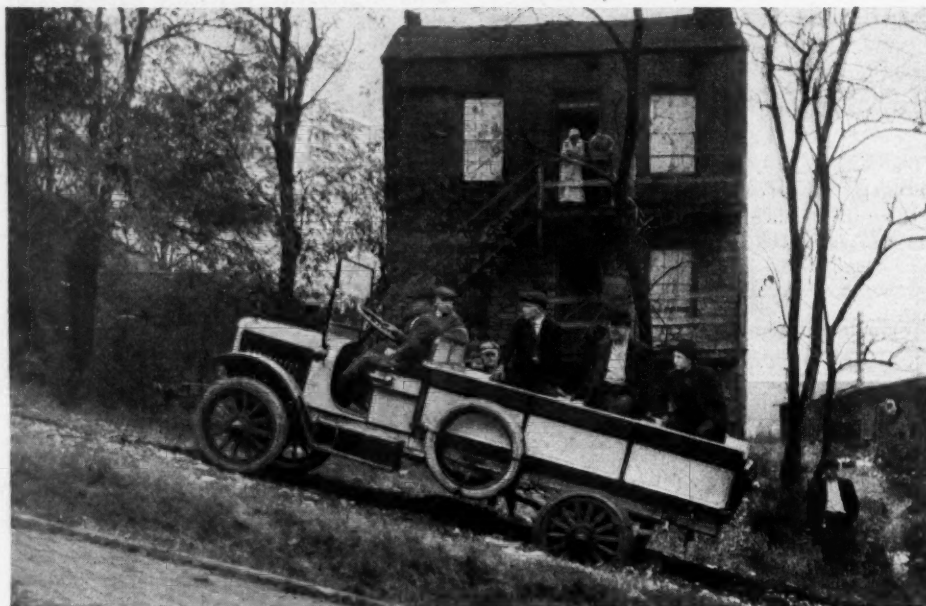
Not lower than 20 below:

Alcohol	20%
Glycerine	20%
Water	60%

Do
Not
Mix
Radiator
Solution
by
Guess.
Use
Formula



Among the Makers and Dealers



DENMO TRUCK MAKES HILL CLIMB—This shows a Denmo truck demonstrating its worth. A dealer in Alton, Ill., had the St. Louis distributor send a truck to Alton for a demonstration. He wanted to be sure of its hill-climbing ability before buying it. Seventh street hill was selected for the test, and an interested crowd gathered at the foot of the hill and wagered as to the truck's ability to make the grade. The Denmo made the grade carrying eight passengers.

PARKER Rust-Proof Issues Stock—The Parker Rust-Proof Co. has authorized a stock issue of \$600,000, 7 per cent cumulative preferred stock and \$1,700,000 common stock.

Goodyear Plans Openings—The Goodyear Rubber Co., Elyria, Ohio, will remodel its property in this city, preparatory to opening the factory next April. B. W. Rote of Akron is to be factory manager.

MacGowan Gets New Position—A. B. MacGowan, formerly in the sales promotion department of the Chase Motor Truck Co., Syracuse, N. Y., has been appointed city sales manager for that company at their Philadelphia branch.

A Car at \$200 Reported—An announcement from Wilkes-Barre, Pa., states that the Duryea Motors, Inc., has leased the cutlery works plant in that city and will start to make motor cars at once. The Duryea Gem is promised at \$200.

Changes in McQuay-Norris Staffs—L. H. Dally has succeeded H. G. Paro as Chicago manager for the McQuay-Norris Mfg. Co. Before transfer to the Chicago office Mr. Dally was chief of the field force of engineers. Other changes are the appointment of H. W. Sweeney as manager of the Pittsburgh branch to succeed J. W. McKeen and that of R. W. Long to manage the Denver branch, the position formerly held by Mr. Sweeney.

Chevrolet Branch Production Increases—The new assembling plant of the Chevrolet Motor Co. at Fort Worth, Texas, will be in operation by Feb. 1. The buildings will be completed by Jan. 1. The assembling plant at Oakland, Cal., is now turning out sixty cars a day and the plant at St. Louis seventy-five cars a day. Operations of the Canadian plant are on a large scale. At Tarrytown, N. Y., the output of cars is the largest in the history of the plant and is running between 125 and 130 cars a day. Sim-

ilarly at Flint the daily output is between 120 and 130 cars.

Feeley to Maxwell Branch—C. R. Feeley has been appointed superintendent of the Pittsburgh service branch of the Maxwell Motor Co.

Shanahan Joins Chase Truck—D. F. Shanahan of Covington, Va., has joined the sales force of the Chase Motor Truck Co., Syracuse, N. Y., as special traveling representative.

Hardware Company Adds Accessories—The Benton County Hardware Co., Rogers, Ark., a wholesale concern, which operates a string of retail stores, has added motor car accessories to its jobbing line.

To Conduct Federal Agent Meetings—J. F. Bowman, sales manager of the Federal Motor Truck Co., will conduct a number of meetings for Federal representatives. He will begin at Atlanta, Ga., next week and will go to Cleveland, Philadelphia, Pittsburgh, Peoria and other cities.

New Kelly-Springfield Branch—The Kelly-Springfield Tire Co. has opened a factory branch in Minneapolis, succeeding the Boger-Stiess Rubber Co., its agent for 2 years. George M. Martin, manager for the Firestone Tire & Rubber Co. branch, has been appointed manager. The territory is Minnesota, the Dakotas, western Wisconsin and western Canada. A. C. Searles is new manager for the Firestone company.

Randall to Leave Case T. M. Co.—O. R. Randall, for 7 years sales manager of the middle western and southwestern territory of the J. I. Case T. M. Co., Racine, Wis., has resigned, effective Jan. 1, to engage in business at Atlanta, Ga., as state distributor of pleasure cars, trucks and tractors. Mr. Randall joined the Case company in 1901, first as agent in Atlanta. In 1909 he accepted a position in the sales organization. His son, Edwin A. Randall, now with the Western

Advertising Agency of Racine, will be associated with him at Atlanta.

White Is Detroit Battery S. M.—C. E. White, formerly connected with the General Electric Co., has been appointed sales manager of the Detroit Battery Co.

Emmons to Re-enter Law—H. H. Emmons, secretary of the Regal Motor Car Co., has resumed the practice of law. He will remain secretary and counsel of the company.

Thomas-Ogilvie Adds Accessories—The Thomas-Ogilvie Hardware Co., Shreveport, La., wholesalers and jobbers, have added motor car accessories and will have a distinct department devoted to that line.

Brugler to Manage Branch—J. A. Brugler has been appointed manager of the new Indianapolis branch of the Racine Horse-Shoe Tire Co., Racine, Wis., which has just been opened.

E. & J. Declares Dividend—The Edmunds & Jones Corp. has declared a dividend of \$1 a share on the common and the regular quarterly dividend on the 7 per cent preferred stock, both payable Jan. 2. This is the third dividend the corporation has declared since March 30, 1916.

Seiders to Represent Bell Car—Victor A. Seiders has been appointed sales agent for the Bell Motor Car Co., York, Pa., in Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida and Tennessee. Mr. Seiders was formerly a salesman for the J. W. Richley Auto Co., York, Pa.

Metallic Rubber Co. Delayed—Because of delay in securing delivery of machinery, the Columbus plant of the Metallic Rubber Co., a subsidiary of the United States Rubber Co., could not open for operation Dec. 1, as was planned. The concern has taken over the former plant of the Midgley Mfg. Co.

Accessory Association Changes Name—The Goodrich Accessory Association of Philadelphia, manufacturer of the Goodrich lock-and-switch for Fords, license brackets, truss rods, ignition assemblies and brake shoes for Fords, has changed its name to the Goodrich-Lenhart Mfg. Co. The officers of the company remain the same.

Attachment Maker Changes Name—An amicable settlement of a suit brought by the Truck Attachment Co., Seattle, against the Wright Truck Attachment Co., was reached recently. The attachments and other products of the Wright Truck Attachment Co. will hereafter be known under the name of Western, and the company will be known as The Western Truck Attachment Co.

Duplex Truck Reorganizes—The Duplex Truck Co. has been organized to take over the Duplex Power Car Co., Charlotte, Mich., but will continue business in Lansing also, where a site will be purchased and a factory erected. The capital is \$1,000,000. H. M. Lee is president and general manager; H. E. Blander, vice-president; and George W. Hewitt, secretary.

Steel Men in Truck Company—The organization personnel of the new Pull-More Truck Co., Pittsburgh, includes H. P. Bope, vice-president of the Carnegie Steel Co.; B. G. Follansbee, president of Follansbee Bros.; D. M. Clemson, director of the Carnegie Steel Co.; J. W. Kinnear, director of the Firth-Sterling Steel Co.; E. M. S. Young, president of the Standard Gauge Steel Co., and George Greer, chairman of the La Belle Iron Works. Contract for a unit system

plant has been let, and the concern expects to place a 3-ton front-drive truck on the market early next spring.

Masten Joins Oakland Co.—W. H. Masten, sales manager with the Moline, Ill., Plow Co., has resigned to join the sales staff of the Oakland Motor Car Co., Pontiac, Mich.

M. S. Dennet Resigns—M. S. Dennet, chief inspector of the Packard Motor Co., has resigned. Mr. Dennet will represent the Muskegon Motor Specialties Co. and the Ajax Forge Co. in Detroit.

Lloyd Joins New York Agency—L. M. Lloyd has been appointed advertising manager for the Edward A. Cassidy Co., New York, agent for motor car accessories. Mr. Lloyd was formerly with the H. W. Johns-Manville Co.

Kellogg Establishes Sixth Branch—The Kellogg Mfg. Co., Rochester, N. Y., maker of engine-driven tire pumps, has opened a new branch at Toledo, Ohio. This makes the sixth branch for the company. Ezra E. Kirk is manager.

Detroit-Wyandotte Sells Stock—The Detroit-Wyandotte Motor Truck Co. is selling its unissued treasury stock to obtain a larger working capital. The concern is going into foreign markets and already has made shipments to Porto Rico and Cuba.

Grossman Organizes Company—Emil Grossman of Brooklyn, manufacturer of motor car accessories and parts, who once had a branch factory in Detroit, has incorporated the National Grossman Mfg. Corp. in Brooklyn with 3,100 shares at \$100 each and 19,000 shares of no par value.

Universal Products to Show—The Universal Motor Products Co., Indianapolis, maker of special sedan tops for Fords, Overlands and other cars, has reserved space and will exhibit at both the Grand Central Palace show, New York, Jan. 6-13, and at the Coliseum, Chicago, Jan. 27-Feb. 3.

Perry Again in America—P. L. D. Perry, president of the Ford Automobile Co. of Great Britain, is again in this country, following a recent trip to England. Mr. Perry states that the British government has issued orders to motor car makers which prohibit them from manufacturing cars for private persons except under special license.

Ford Dealers Hold Meeting—Ford dealers in southern Wisconsin and northern Illinois met at Beloit, Wis., recently to discuss business and sales plans. R. J. Pearce, traveling representative of the Milwaukee branch of the Ford Motor Co., was present to explain the new ruling that no cars would be shipped to agents until signed orders had been received.

Akron, Ohio.—India Rubber Co.; capital stock, \$250,000; to manufacture rubber articles; incorporators, J. M. Alderfer, J. W. Chamberlain, Paul C. Searls, J. K. Williams and Francis Seiberling.

Coshocton, O.—Peerless Tire & Rubber Co.; capital stock, \$10,000; to manufacture tires; incorporators, W. P. Horton, Jr., J. S. Culp, Thomas Brennan, Herbert P. Lawrence and M. B. Glore.

Cincinnati, O.—Cincinnati Starter Service Co.; capital stock, \$10,000; to operate a garage; incorporators, L. E. Armentraut, A. F. French, R. M. Moffat, William P. Rogers and W. M. Turner.

Cleveland, O.—Guardian Tire & Rubber Co.; capital stock, \$10,000; to deal in tires and tubes; incorporators, W. O. Wingarter, E. J. Hemington, Celia Prince, Charlotte Wingarter and Rush E. Griffith.

Cleveland, O.—Little Giant Converter Co.; capital stock, \$10,000; incorporators, G. E. Dustman, K. E. Potter, G. H. Smith, Frank Santry and M. G. Delaney.

Grand Rapids, Mich.—S. & S. Auto Lock Co.; capital stock, \$20,000; incorporators, Edward W. Slauson, Judge W. B. Brown and Allen M. Freeland.

Hartford, Conn.—Eastern Motors Co.; capital stock, \$1,000,000; incorporators, Willis D. Upson, F. A. Law, J. F. Turk and others.

Indianapolis, Ind.—Burkhardt Motor Co.; manufacture motor car motors; capital stock, \$10,000; incorporators, Alexander Burkhardt, Lena Burkhardt and Noble H. White.

Jeannette, Pa.—Oliver Automobile Co.; capital stock, \$5,000; incorporators, G. L. Oliver, A. B. Shafer and A. C. Snively.

cieved from the customer. The policy is a result of the shortage of cars.

Victor Co. Changes Location—The Victor Motor Co., which recently purchased land at Claymont, Del., for a plant, has decided to locate at Jenkintown, Pa.

Goodwear Starts Production—The Goodwear Rubber Co. has started production at Elyria, Ohio. The company employs 150 men and makes 300 tires and 200 tubes daily.

Budd Co. Appoints Representatives—Earle & Bogg, New York, have been appointed eastern representatives of the Budd Co., maker of motors for motor cars, trucks and tractors.

Plow Buys Montreal Business—H. C. Plow has purchased the Automobile Owners' Accessory Co., Ltd., of Montreal, Canada. Mr. Plow was at one time treasurer of the Hartford Rubber Co.

Ruggles Becomes Factory Manager—A. R. Ruggles has been appointed factory manager of the United Motors Co. of Grand Rapids. Mr. Ruggles has been connected with the motor industry for the last 11 years.

Waterfall with Dodge Bros.—A. T. Waterfall has accepted a position with Dodge Bros. as traffic director. Mr. Waterfall has been the traffic commissioner of the Detroit Board of Commerce for the last 5 years.

Ridge to Porter Rubber Co.—R. C. Ridge has been appointed superintendent of the Porter Rubber Co., Salem, O., to succeed C. F. Piskton. Mr. Ridge was formerly superintendent of the Marathon Tire & Rubber Co., Akron, O.

Line Not with K. C. Form-A-Truck—The Smith Form-A-Truck branch at Kansas City, recently opened, announces that F. J. Line has no connection with the company. It was reported in Motor Age Nov. 23 that he had been appointed manager.

Nash Motors Salesmen Meet—The sales managers for the Nash Motors Co. held a 2-day convention at Kenosha, Wis. Seventy-five men attended. Prince Wells, Louisville, Ky., was the oldest in point of service, having been with the company for 30 years, starting when it manufactured bicycles.

Stegman Plant Expands—Plans for doubling the capacity of the Stegman Motor Car Co., Milwaukee, Wis., manufacturer of motor trucks, include a building to cost about \$50,000 complete. It will be devoted principally to assembling. The Stegman plant has been crowded with orders for more than a year, but until a few weeks ago it had been found impossible to obtain sufficient acreage for extension and for a time it

seemed necessary to find a new site and erect a complete new group. The extensions will practically double the capacity.

Dorris Drops Light Wagon—The Dorris Motor Car Co., St. Louis, has discontinued the manufacture of its 1,500-lb. delivery wagon.

Million Dollar Refinery Soon—The Cabin Creek Refining Co., subsidiary of the Ohio Cities Gas Co., will build a gasoline refining plant to cost about \$1,000,000 at Charleston, W. Va. The plant is to be completed by July.

Ford Dealer to Make Linings—Joseph Sairs, Ford dealer at Beloit, Wis., has bought a factory site for the manufacture of brake linings and will specialize in such supplies for the Ford. Work will begin about March 15.

Williams Leaves Overland—Wallace M. Williams, a member of the advertising department of the Willys-Overland Co. in Toledo during the last year, has opened a general advertising office in Syracuse, N. Y. Mr. Williams was previously advertising manager of the Franklin Automobile Co., Syracuse.

Opens Accessory Department—The Moeszinger-Marquis Hardware Co., Clinton, Iowa, has opened a tire and accessory department and has made a contract to handle the Horse Shoe tires and tubes in eastern Iowa. A. H. Hopkins, who has been in the tire and accessory business several years, will manage the department.

Guthrie to Multiple Clutch Co.—James Guthrie has joined the force of the Multiple Cone Clutch Co., Cleveland, Ohio. Mr. Guthrie built the first two models of the Maxwell twenty-five and has built French and American Briscoes. He left the Briscoe company May 1 and was production manager of the Curtiss Aeroplane Motor Co.

Ford Co. Work Halted—A preliminary injunction has been granted against the Ford Motor Co., halting construction of railroad tracks in a section adjoining the Ford factory. Property owners secured the injunction, stating that the property was of a restricted nature and only for high grade residences.

Sedley Joins Eisemann Company—Parke G. Sedley has become a member of the sales organization of the Eisemann Magneto Co. of New York. Mr. Sedley will be for the present with the general office in Brooklyn. About Jan. 15 he is to take charge of the branch that will be opened in Chicago. Mr. Sedley was formerly manager of the New York branch of the Heinze Electric Co. of Lowell, Mass.

Milwaukee, Wis.—General Motor Truck Co.; capital stock, \$5,000; to deal in new and used motor trucks, etc.; incorporators, W. H. Schurman, L. M. Jeger and E. M. Jordan.

Milwaukee, Wis.—The Achen Motor Co., of Milwaukee; capital stock, \$45,000; to deal in new and used cars, accessories, operate garage, etc.; incorporators, F. W. B. Achen, Arthur Gardiner, Robert Gardiner and Hugo C. Boorse.

Memphis, Tenn.—Dixie Motor Sales Co.; capital stock, \$25,000; incorporators, J. L. Brode, F. W. Brode, Max Patteson, R. B. Heddon and C. N. Bender.

Phoenix, Ariz.—Eisenhuth Motor Co.; capital stock, \$10,000,000; to manufacture motor cars and vehicles of all kinds; incorporators, J. W. Eisenhuth, Frank D. McClure, F. S. Cary, O. D. Weidner and John Schneider.

Quincy, Ill.—The Cadillac Co.; capital stock, \$10,000; to manufacture and deal in motor vehicles; incorporators, R. O. Travis, C. R. Fulmer and R. D. Law.

San Antonio, Tex.—Lowry & Doolin, capital stock, \$10,000; incorporators, W. E. Lowry, C. B. Doolin.

Toledo, Ohio.—Bliss Auto Sales Co.; capital stock, \$10,000; to sell motor cars; incorporators, D. W. Bliss, Geo. W. Ritter, B. C. Swisher, E. Halliday and M. Hotchkiss.

Troy, N. Y.—Tracy Trailer Sales Co.; capital stock, \$10,000; incorporators, Charles A. Gieger, G. R. Harris, H. H. Tamplin, R. C. Sykes and C. N. Peters.

Trenton, N. J.—Federal Automobile and Supply Co.; capital stock, \$100,000; incorporators, Charles M. Reeves, William A. Walton, Thomas R. Roberts.



Louisville, Ky.—Yellow Cab Co.; capital stock, \$4,000; incorporators, Robert F. Hibbitt, Robert L. Lawson and H. B. Swearingen.

Lebanon, Ind.—Lebanon Auto Sales Machine Co.; capital stock, \$10,000; to engage in the repairing and rebuilding of motor cars; incorporators, William F. Threewits, William H. Green and M. H. G. Oedecker.

Louisville, Ky.—Thomas Garage; capital stock, \$25,000; incorporators, W. A. Thomas, Vincent Thomas and Florence J. Gathof.

Louisville, Ky.—The Main Street Garage; capital stock, \$5,000; incorporators, J. F. Marx, William Pfaffinger and T. Hicks Martin.

Louisville, Ky.—Central Motor Car Co.; capital stock, \$15,000; incorporators, Allen H. Douglas, Robert L. Thomas and H. C. Dunavent.

Leechburg, Pa.—Kiski Auto Supply Co.; capital stock, \$25,000; incorporators, Aaron Gutzler, H. T. Cook, U. O. Heilman, C. F. Armstrong, D. S. McCollum, J. N. Crosby, T. E. Jones, R. E. Bracy, J. Lees, O. C. Neely, Fred Hill.

From the Four Winds

BASEBALL Men Selling Cars—From baseball to the motor industry is not such a far cry after all, as one of the Philadelphia team's pitchers, Erkin Mayer, has signed up to sell cars for a Philadelphia agency, and a member of the St. Louis Browns, George Sisler, has signed up, too, for the sales force of the Maxwell Motor Co. at Detroit for the winter.

Playing Golf and Motoring—The latest has it that the rich play golf and the poor motor. Which does your state do? Iowa, for instance, has a motor car for every thirteen persons, California for every fifteen, Nebraska for every sixteen, Minnesota for every seventeen and New York for every thirty-nine. More than 3,000,000 cars and trucks are now in use in the United States, it is figured.

Good Roads Work

To Dedicate Good Roads—The Illinois Highway Improvement Association will dedicate newly made hard roads Dec. 14 in Vermillion county. W. G. Edens, president of the association, has invited Governor Dunne and Governor-elect Lowden to attend. Both are good road enthusiasts.

Pennsylvania Wants New Road—Pennsylvanians have asked the state highway department to co-operate in the movement for a new highway to extend from Harrisburg to the New York state line at Troy. The road is to be known as the Susquehanna trail and will extend through Lycoming and Bradford counties.

Good Roads Boosters Meet—Fifty hard-road boosters from various cities along the Alton way attended a banquet at Carlinville, Ill., recently. Edward Lott, president of the Alton Way Association, presided. B. F. Caldwell, Springfield, Congressman; H. B. Herb, Alton, and C. T. Woodward, Carlinville, spoke.

Highway Marking Progresses—The Meridian highway is to be marked from Cairo, Ill., to Lake Superior by July 1, according to Malcolm MacKinnon of Rockford, Ill., secretary of the association. Painters have just completed marking the route as far south as Pana, giving 300 miles of continuous marking north of that city.

Gives \$45,000 for Road—A bond issue of \$45,000 voted by the Kenosha county, Wisconsin, board will construct the section of Sheridan road between the Illinois state line and Kenosha and make possible the completion of a 4-mile link by the end of next summer. The issue is the result of a 10-year struggle on the part of the good roads enthusiasts of Kenosha county.

Association Makes Suggestions—The Washington State Good Roads Association has adopted resolutions asking the state legislature to pass a law preventing road deterioration by overloading and excessive speeding, and recommending a law requiring all horse-drawn vehicles to carry a lighted lantern on the left-hand side at night; the levy of 1½ mills for permanent highways until the present highway program as outlined is completed; an increase of the maintenance fund from 7½ per cent to 10 per cent of the total highway fund; the completion of a cross state highway through legislative appropriation; making the office of county engineer appointive; and an amendment to the motor act to standardize the speed, lighting and other requirements in the safe operation of motor cars. The association also wants the

returns from license fees included in the maintenance fund of the permanent highway fund and a uniform system of road markers for state roads.

Arkansas County Builds Roads—Crittenden county, Arkansas, will build 14 miles of concrete road in its coming good roads activity. The first one-course concrete road in Arkansas is just being completed in Phillips county. It is 18 ft. wide and about 2 miles long.

Road Work in Washington—During the last year 40.5 miles of hard-surfaced roads have been constructed in Pierce county, Washington, at an approximate cost of \$517,900. The mileage consists of 23.9 miles of concrete, 4 miles of sheet asphalt, 8.9 miles of bitulithic and 3.7 miles of warrenite. Pierce county has approximately 1,040 miles

of roads. This consists of 614 miles of earth roads, 360 miles of gravel roads and about 66 miles of hard-surface roads of various types.

Adds to Good Roads Fund—The Fort Dodge, Iowa, Auto Dealers' Association has added \$2,000 to the commercial club's \$25,000 good roads fund.

Concrete Road May Cross Kansas—A committee appointed at the fifth annual convention of the National Olds Trails Road Association to investigate and recommend types of construction for a road to traverse Kansas from east to west has recommended the construction of a 500-mile concrete road. Owing to the size of the project and the necessary preliminaries it is doubtful whether actual work can begin before next year.

Coming Motor Events

RACES

—1916—

*December 25—Speedway, Los Angeles, Cal.

—1917—

May 19—Metropolitan Trophy, New York speedway.

†May 30—Indianapolis speedway.

†June 9—Chicago speedway.

June 23—Cincinnati speedway

†July 4—Omaha speedway.

†July 14—Des Moines speedway.

†July 28—Tacoma speedway.

August 4—Kansas City speedway.

†September 3—Cincinnati speedway.

†September 15—Providence speedway.

†September 29—New York speedway.

October 6—Kansas City speedway.

October 13—Chicago speedway.

October 27—New York speedway.

* Sanctioned by A. A. A.

† A. A. A. championship events for 1917.

MEETINGS

January 9-11—Mid-winter meeting, Society of Automobile Engineers.

SHOWS

December 18-20—San Francisco show.
December 30-January 6—Cleveland, O., show.

January 2-10—Salon, Hotel Astor, New York.

January 5-11—Milwaukee, Wis., show.

January 6-13—New York show.

January 12-20—Philadelphia show.

January 13-20—Montreal show.

January 14-16—Rockford, Ill., show.

January 19-24—Manchester, N. H., show

January 20-27—Detroit show.

January 22-27—Oklahoma City show.

January 22-27—Rochester, N. Y., show.

January 25-27—Asheville, N. C., show.

January 23-27—Allentown, Pa., show

January 23-27—Baltimore show.

January 27-February 3—Chicago show.

January 29-February 3—Buffalo show.

February 3-10—Minneapolis show.

February 10-17—San Francisco show.

February 12-17—Kansas City show.

February 12-17—Louisville, Ky., show.

February 12-17—Louisville, Ky., show.

February 13-17—Sioux City, Ia., show.

February 14-17—Peoria, Ill., show.

February 14-24—Des Moines, Ia., show.

February 18-25—St. Louis, Mo., show.

February 19—Pittsfield, Mass., show.

February 19-24—Bridgeport, Conn., show.

February 19-24—Des Moines, Ia., show.

February 19-24—Duluth, Minn., show.

February 26-March 3—Omaha, Neb., show.

March 1-3—Urbana, Mich., show

March 3-10—Boston show.

March 5-10—Bangor, Me., show

March 6-10—Fort Dodge, Ia., show.

March 14-17—Davenport, Ia., show.

March 14-17—Mason City, Ia., show

March 18-23—Cedar Rapids, Ia., show

March 19-24—Syracuse show.

The Show Circuit

Louisville Show Plans Large—The Louisville Automobile Dealers' Association show to be held in the armory, Feb. 12-17, will be the largest south of the Ohio river. The building offers 54,000 sq. ft. for display.

Peoria Dealers to Have Show—The Peoria, Ill., show, which is set for Feb. 14-17, will be that of the Automobile and Accessory Dealers' Association and will be in the coliseum as in former years.

Hartford Plans Show—Plans for the 1917 motor show of the Hartford, Conn., dealers indicate the show will be held the latter part of February in the First Regiment armory.

Bridgeport Show Planned—The Bridgeport, Conn., motor show, which is to be held Feb. 19-24, will be under the auspices of the city battalion with B. B. Steiber as manager. Two separate buildings will be used to provide the needed space of 30,000 sq. ft.

Sioux City Date Selected—The Sioux City, Iowa, Automobile Dealers' Trade Association has selected the dates Feb. 13-17 for its motor show this season and are planning twice as much room as before. An annex to the auditorium is being built, and a large portion of it will be given to accessories.

Philadelphia Show in Museum—The next annual motor show of the Automobile Trade Association of Philadelphia will be held in the Commercial Museum Jan. 12-20. The municipal auditorium, in which the show was held last January, has been declared unsafe. The museum, however, has 50 per cent additional floor space, in all about 90,000 sq. ft.

Milwaukee Show—Plans for the ninth annual Milwaukee motor show, to be held Jan. 6-11, under the auspices of the Milwaukee Automobile Dealers, Inc., are well under way, and drawings for space will be made soon. Demands for space may require the second floor of the auditorium. In past years the lower floor and the basement were sufficient.

St. Louis Show Site Chosen—The St. Louis motor show, Feb. 19-24, will be held in the Overland building, a seven-story structure now in process of erection. The building will have 22,500 sq. ft. of display space on each floor and is fully equipped with motor car elevators. The question of ample elevators was a stumbling block in the selection of a building. No show or convention building in the city has 150,000 sq. ft. of space, and new office buildings available do not have the freight elevator capacity.